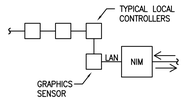
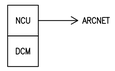
BLDG #47 (ACA ADDITION)
EXISTING AUTOMATED LOGIC WEBCTRL SYSTEM
WITH WEB-BASED ACCESS, FULL SYSTEM GRAPHICS, ETC...



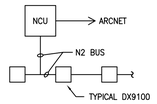
LAN

BLDG 14
1
1_NCU
1_DCM
DX9100
UNT
TOTAL
3
AI 2_AO 9_DI 11_DO



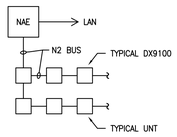
ARCNET

BLDG 62
1
NCU
0_DCM
13_DX9100
0_UNT
TOTAL
HARDWARE POINTS
56_AI 5_AO 58_DI 5_DO
SOFTWARE POINTS 18_AD 19_BD 31_AOS



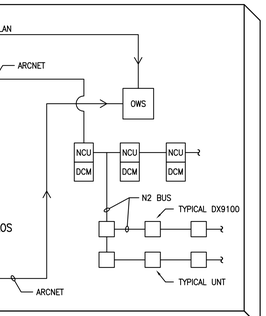
ARCNET RG62

NAE (Located in Bldg 47 Operations/ Chiller Room)
OWS
0_DCM
28_DX9100
15_UNT
TOTAL
HARDWARE POINTS
173_AI 17_AO 77_DI 75_DO
SOFTWARE POINTS 26_AD 8_BD 119_AOS



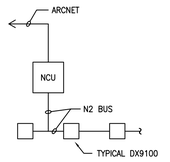
LAN

BLDG 47
1
OWS
6_NCU
10_DCM
4_DX9100
49_UNT
TOTAL
HARDWARE POINTS
242_AI 26_AO 102_DI 62_DO
SOFTWARE POINTS 87_AD 152_BD 119_AOS



ARCNET RG62

BLDG 15, 63, 65
1
NCU
0_DCM
5_DX9100
0_UNT
TOTAL
20
AI 11_AO 18_DI 6_DO



NOTES:
1. DRAWINGS ARE APPROXIMATE. CONTRACTOR RESPONSIBLE FOR FIELD VERIFYING EXACT EQUIPMENT, QUANTITIES, AND CONDITIONS PRIOR TO BIDDING.

LEGEND

NCU	NETWORK CONTROL UNIT (ARCNET / N2 BUS)
DCM	DIGITAL CONTROL MODULE
DX9100	PROGRAMMABLE CONTROLLERS (N2 BUS)
UNT	UNITARY CONTROLLERS (N2 BUS)
NAE	NETWORK AUTOMATION ENGINE (ETHERNET / LAN / N2 BUS)
NCE	NETWORK CONTROL ENGINE (ETHERNET / LAN / N2 BUS)
OWS	OPERATOR WORK STATION
AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
NIM	NETWORK INTERFACE MODULE

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved, and shall be provided by the contractor at no additional cost to the government.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R McDOWELL 6-6-08

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: EXISTING CAMPUS HVAC CONTROLS BLOCK DIAGRAMS / ARCHITECTURE

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO.: M001

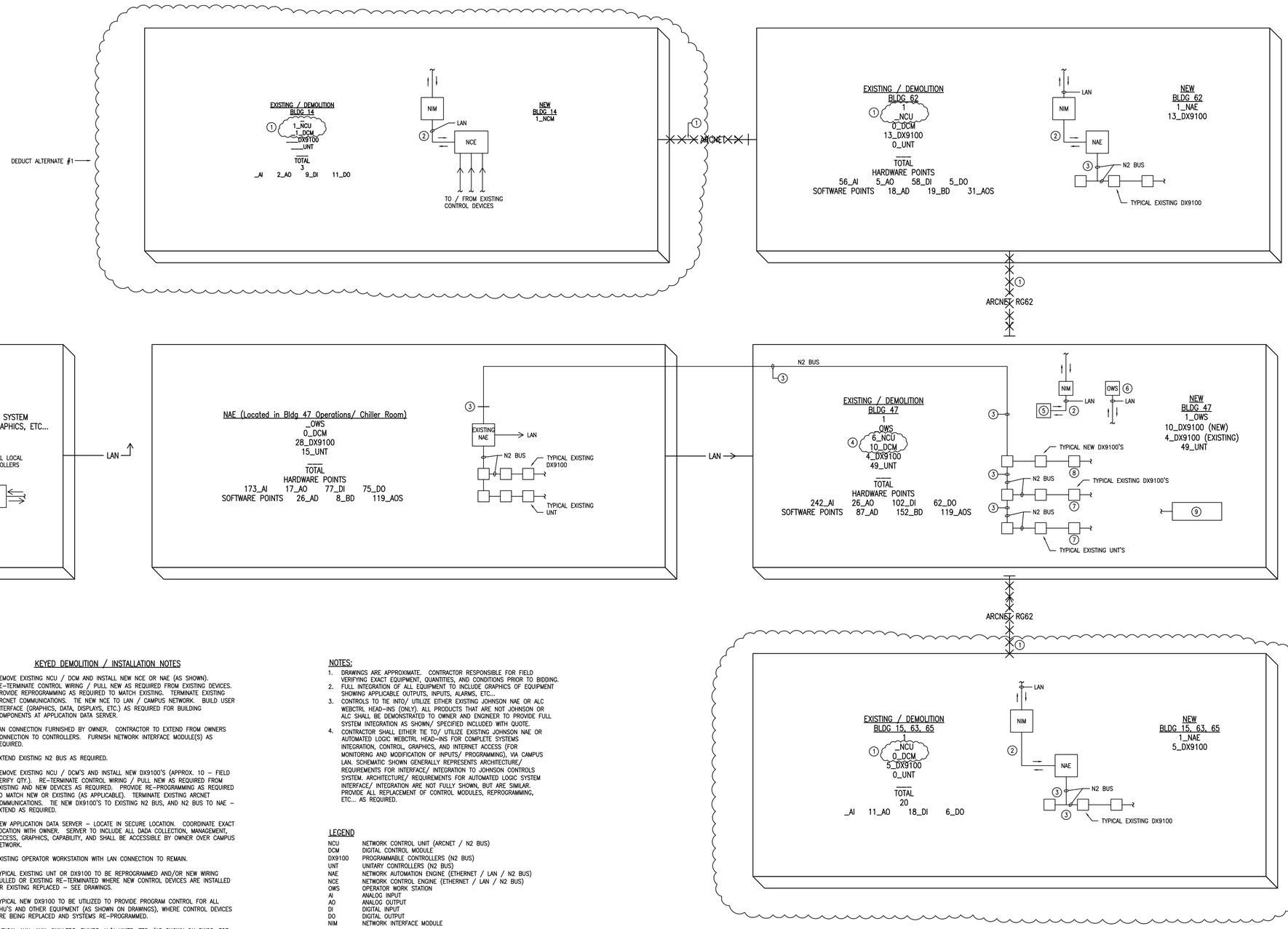
Dwg. 2 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities

Department of Veterans Affairs



KEYED DEMOLITION / INSTALLATION NOTES

1. REMOVE EXISTING NCU / DCM AND INSTALL NEW NCE OR NAE (AS SHOWN). RE-TERMINATE CONTROL WIRING / PULL NEW AS REQUIRED FROM EXISTING DEVICES. PROVIDE REPROGRAMMING AS REQUIRED TO MATCH EXISTING. TERMINATE EXISTING ARCNET COMMUNICATIONS. TIE NEW NCE TO LAN / CAMPUS NETWORK. BUILD USER INTERFACE (GRAPHICS, DATA, DISPLAYS, ETC.) AS REQUIRED FOR BUILDING COMPONENTS AT APPLICATION DATA SERVER.
2. LAN CONNECTION FURNISHED BY OWNER. CONTRACTOR TO EXTEND FROM OWNERS CONNECTION TO CONTROLLERS. FURNISH NETWORK INTERFACE MODULE(S) AS REQUIRED.
3. EXTEND EXISTING N2 BUS AS REQUIRED.
4. REMOVE EXISTING NCU / DCM'S AND INSTALL NEW DX9100'S (APPROX. 10 – FIELD VERIFY QTY.). RE-TERMINATE CONTROL WIRING / PULL NEW AS REQUIRED FROM EXISTING AND NEW DEVICES AS REQUIRED. PROVIDE RE-PROGRAMMING AS REQUIRED TO MATCH NEW OR EXISTING (AS APPLICABLE). TERMINATE EXISTING ARCNET COMMUNICATIONS. TIE NEW DX9100'S TO EXISTING N2 BUS, AND N2 BUS TO NAE – EXTEND AS REQUIRED.
5. NEW APPLICATION DATA SERVER – LOCATE IN SECURE LOCATION. COORDINATE EXACT LOCATION WITH OWNER. SERVER TO INCLUDE ALL DADA COLLECTION, MANAGEMENT, ACCESS, GRAPHICS, CAPABILITY, AND SHALL BE ACCESSIBLE BY OWNER OVER CAMPUS NETWORK.
6. EXISTING OPERATOR WORKSTATION WITH LAN CONNECTION TO REMAIN.
7. TYPICAL EXISTING UNT OR DX9100 TO BE REPROGRAMMED AND/OR NEW WIRING PULLED OR EXISTING RE-TERMINATED WHERE NEW CONTROL DEVICES ARE INSTALLED OR EXISTING REPLACED – SEE DRAWINGS.
8. TYPICAL NEW DX9100 TO BE UTILIZED TO PROVIDE PROGRAM CONTROL FOR ALL AHU'S AND OTHER EQUIPMENT (AS SHOWN ON DRAWINGS), WHERE CONTROL DEVICES ARE BEING REPLACED AND SYSTEMS RE-PROGRAMMED.
9. TYPICAL AHU, AUX. CHILLERS, PUMPS. H/V UNITS, ETC. (AS SHOWN ON DWGS. FOR BLDG. 47)-WITH NEW CONTROL DEVICES, WIRING/CONDUIT, PROGRAMMING, ETC. AS REQUIRED PER DWGS..

NOTES:

1. DRAWINGS ARE APPROXIMATE. CONTRACTOR RESPONSIBLE FOR FIELD VERIFYING EXACT EQUIPMENT, QUANTITIES, AND CONDITIONS PRIOR TO BIDDING.
2. FULL INTEGRATION OF ALL EQUIPMENT TO INCLUDE GRAPHICS OF EQUIPMENT SHOWING APPLICABLE OUTPUTS, INPUTS, ALARMS, ETC...
3. CONTROLS TO TIE INTO/ UTILIZE EITHER EXISTING JOHNSON NAE OR ALC WEBCTRL HEAD-INS (ONLY). ALL PRODUCTS THAT ARE NOT JOHNSON OR ALC SHALL BE DEMONSTRATED TO OWNER AND ENGINEER TO PROVIDE FULL SYSTEM INTEGRATION AS SHOWN/ SPECIFIED INCLUDED WITH QUOTE.
4. CONTRACTOR SHALL EITHER TIE TO/ UTILIZE EXISTING JOHNSON NAE OR AUTOMATED LOGIC WEBCTRL HEAD-INS FOR COMPLETE SYSTEMS INTEGRATION, CONTROL, GRAPHICS, AND INTERNET ACCESS (FOR MONITORING AND MODIFICATION OF INPUTS/ PROGRAMMING), VIA CAMPUS LAN. SCHEMATIC SHOWN GENERALLY REPRESENTS ARCHITECTURE/ REQUIREMENTS FOR INTERFACE/ INTEGRATION TO JOHNSON CONTROLS SYSTEM. ARCHITECTURE/ REQUIREMENTS FOR AUTOMATED LOGIC SYSTEM INTERFACE/ INTEGRATION ARE NOT FULLY SHOWN, BUT ARE SIMILAR. PROVIDE ALL REPLACEMENT OF CONTROL MODULES, REPROGRAMMING, ETC... AS REQUIRED.
5. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
6. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
7. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
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LEGEND

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AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
NIM	NETWORK INTERFACE MODULE

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDONELL 12-6-05

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

Drawing Title: NEW CAMPUS HVAC CONTROLS BLOCK DIAGRAMS / ARCHITECTURE & INTEGRATION

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

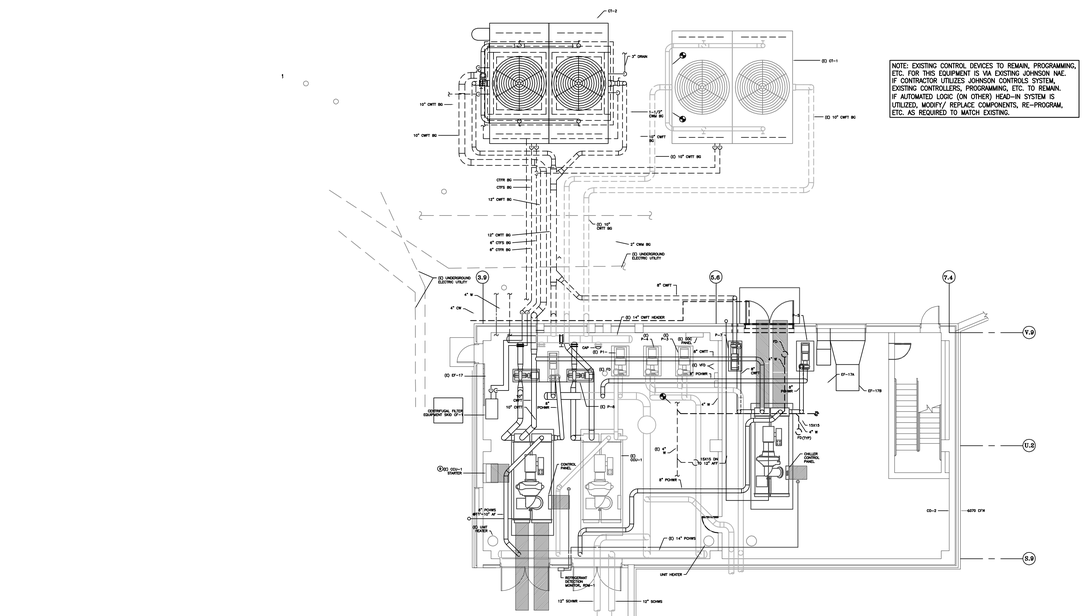
DRAWING NO.: M002

Dwg. 3 of 29

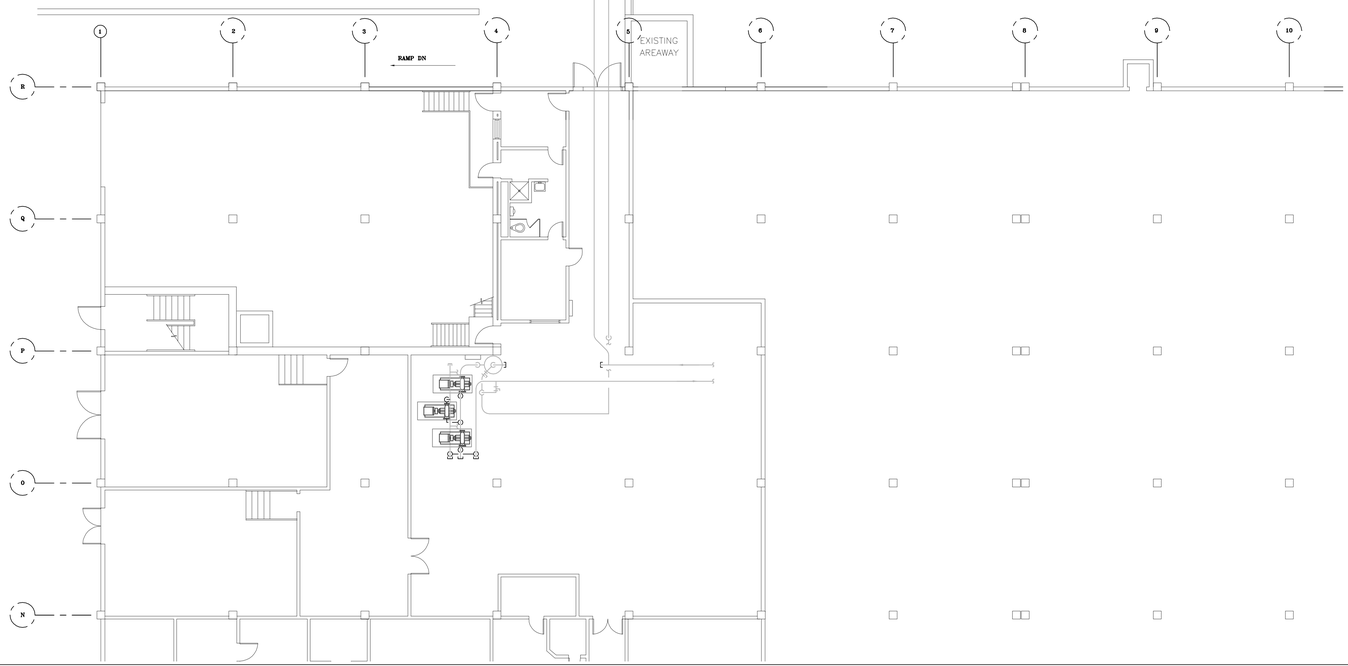
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

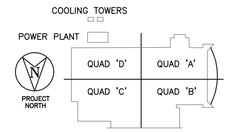
Location: ASHEVILLE, N.C.

Office of Facilities — Department of Veterans Affairs



NOTE: EXISTING CONTROL DEVICES TO REMAIN, PROGRAMMING, ETC. FOR THIS EQUIPMENT IS VIA EXISTING JOHNSON NAE. IF CONTRACTOR UTILIZES JOHNSON CONTROLS SYSTEM, EXISTING CONTROLLERS, PROGRAMMING, ETC. TO REMAIN. IF AUTOMATED LOGIC (OR OTHER) HEAD-IN SYSTEM IS UTILIZED, MODIFY/ REPLACE COMPONENTS, RE-PROGRAM, ETC. AS REQUIRED TO MATCH EXISTING.





KEY PLAN
NOT TO SCALE

GENERAL NOTE:
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BUILDING IS FULLY SPRINKLERED

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

Seal:

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 6-6-08 REGISTERED MARK R. McCONNELL

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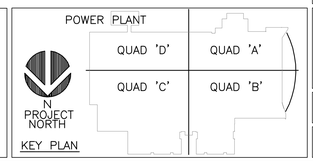
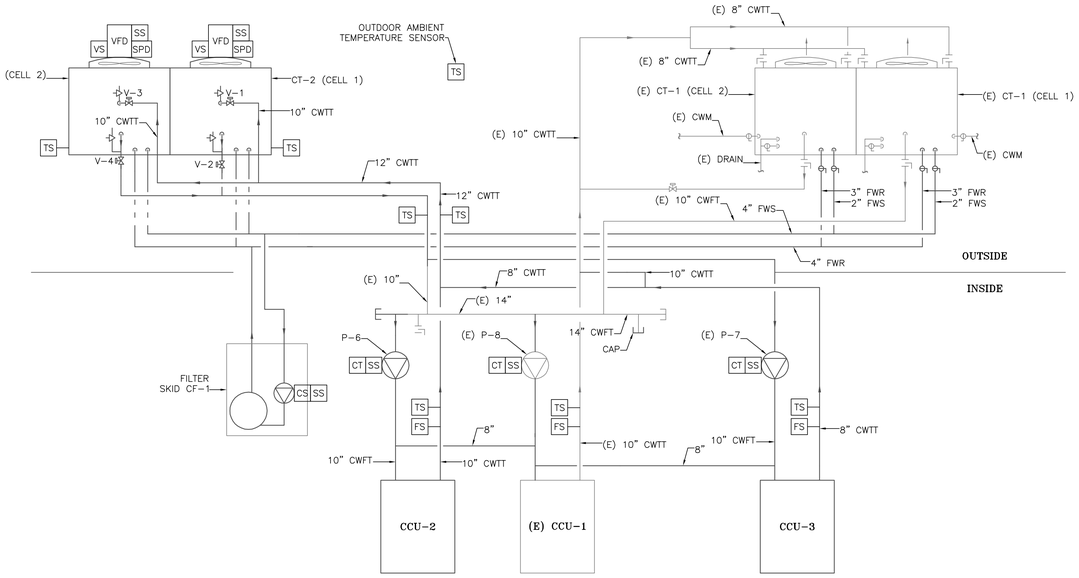


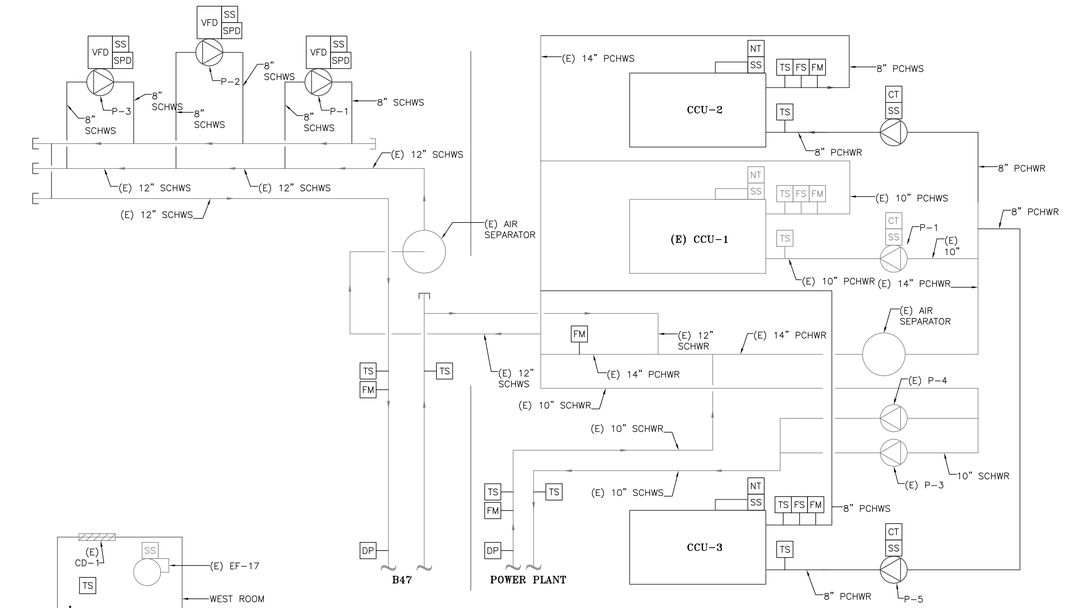
KEY PLAN

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30	
Drawing Title: CHILLER ROOM MECHANICAL PLAN BUILDING 47 - BASE BID	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS	Date: 03-13-08
		Project No.: 637-08-103
Approved By:	Building Number: 47 / Checked: MRM / Drawn: WTJ	DRAWING NO.: M003
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.	Dwg. 4 Of 29

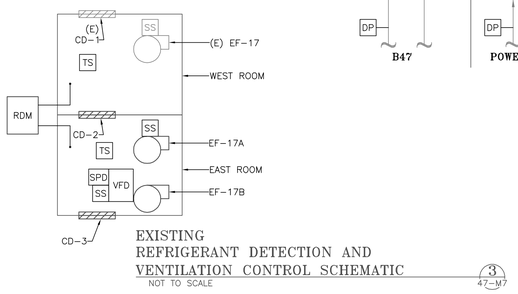
Office of Facilities
Department of Veterans Affairs



EXISTING CONDENSER WATER CONTROL SCHEMATIC (1)
NOT TO SCALE 47-M7



EXISTING CHILLED WATER CONTROL SCHEMATIC (2)
NOT TO SCALE 47-M7



EXISTING
REFRIGERANT DETECTION AND
VENTILATION CONTROL SCHEMATIC (3)
NOT TO SCALE 47-M7

GENERAL SHEET NOTES

1. (E) EQUIPMENT IS SHOWN FOR REFERENCE ONLY.

2. COORDINATE PIPING, INSTRUMENTATION, AND VALVE LOCATIONS WITH PIPING/MECHANICAL CONTRACTOR. SEE SHEET 47-M6 FOR INFORMATION.

3. DIAGRAMS ARE SCHEMATIC IN NATURE AND INTENDED TO SHOW THE GENERAL LOCATION OF SENSORS, COTNROLLED DEVICES, ETC. SEE POINT MATRICES, SEQUENCE OF OPERATIONS, AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS, SENSORS, AND DEVICES. PIPING IS SHOWN FOR REFERENCE ONLY. SEE PIPING DIAGRAMS AND PLANS.

4. DEVICE AND NETWORK CABLING IS NOT SHOWN. PROVIDE ALL NECESSARY CONTROL WIRING AND CONDUIT AS NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTE. SEE ELECTRICAL SHEETS AND SPECIFICATIONS FOR INFORMATION.

SEQUENCES OF OPERATION

CONTROLS

THE CHILLERS SHALL BE FURNISHED WITH A FACTORY INSTALLED AND TESTED MICROPROCESSOR-BASED CONTROL PANEL. THE PANEL SHALL INCLUDE ALL CONTROLS AND SEQUENCES AS NECESSARY FOR THE SAFE AND RELIABLE STAND-ALONE OPERATION OF THE CHILLER. THE CHILLER CONTROL PANEL SHALL INCORPORATE A FULLY-FUNCTIONAL INTERFACE WHICH SHALL MAKE ALL INTERNAL CHILLERS POINTS AVAIABLE TO THE FRONT-END.

ALL DEVICES SHWON WITH AN NT SYMBOL SHALL BE EQUIPPED WITH A GATEWAY TO THE MANUFACTURER'S STANDARD SYSTEM BUS. THIS GATEWAY SHALL MAKE AVAILABLE TO THE DDC SYSTEM AND FRONT-END ALL MONITORED VALUES, SETPOINTS, AND SYSTEM INFORMATION.

GENERAL CONTROLS NOTES
THERE IS AN EXISTING ALC DDC SYSTEM SERVING THE (E) POWER PLANT INCLUDING THE (E) CHILLER CCU-1, COOLING TOWER CT-1, AND THEIR ASSOCIATED PUMPS. ALL POINTS FROM THE (E) ALC CHILLED WATER SYSTEM CONTROLS SHALL BE INTEGRATED WITH THE NEW CHILLED WATER SYSTEM CONTROLS TO FORM A COMPLETE AND INTEGRATED SYSTEM. SEE SPECIFICATION SECTION 15920 FOR MORE INFORMATION.

CHILLER SEQUENCING

THE CHILLER SHALL BE ENABLED THROUGH EITHER A PROGRAM FUNCTION (I.E. TIME OF DAY) OR MANUALLY BY AN OPERATOR. THE CHILLER SHALL BE STARTED IN THE FOLLOWING MANNER:

START DESIGNATED PRIMARY CHILLED WATER PUMP
WHEN PUMP OPERATION AND FLOW STATUS IS CONFIRMED, START THE CHILLER. ONCE STARTED, THE CHILLER SHALL OPERATE THROUGH ITS OWN OPERATING AND SAFETY CONTROLS.

UPON SHUTDOWN OF THE CHILLER, EITHER THROUGH AN ALARM(LOW FLOW, LOW TEMPERATURE, ETC.) OR A CAPACITY REDUCTION, THE CHILLER AND ASSOCIATED PUMPS SHALL GO THROUGH THE FOLLOWING SHUTDOWN SEQUENCE:

STOP CHILLER OPERATION
AFTER A USER ADJUSTABLE TIME DELAY (> 5 MINUTES) STOP THE PRIMARY CHILLED WATER PUMP AND THEN THE DESIGNATED CONDENSER WATER PUMP.

TWO (2) FIELD INSTALLED FLOW SWITCHES IN THE CHILLED WATER SUPPLY LINE IN SERIES SHALL LOCK OUT THE CHILLER UNTIL FLOW IS PROVEN AND SHALL STOP THE CHILLER AT ANY TIME THAT MINIMUM FLOW IS NOT PRESENT. A CONDENSER WATER FLOW SWITCH SHALL LOCK OUT THE CHILLER UNTIL FLOW IS PROVEN AND SHALL STOP THE CHILLER ANY TIME THAT MINIMUM FLOW IS NOT PRESENT.

MONITOR THE CHILLED WATER SUPPLY AND RETURN TEMPERATURES, KILOWATT USAGE (CHILLER AND CHILLED WATER PUMP), AND THE CHILLER ALARM CIRCUIT. PROVIDE A TREND LOG OF OUTDOOR AIR, CHILLED WATER SUPPLY, AND CHILLED WATER RETURN. SAMPLES ARE TO BE TAKEN EVERY MINUTE AND AVERAGED FOR THE TREND LOG TO DISPLAY IN 30 MINUTE UNITS. THIS TREND LOG SHALL BE AVAILABLE ON DEMAND. MONITOR THE ALARM CONTACTS ON THE CHILLER AND REPORT ANY ALARM TO THE LAN. THE CHILLER SHALL NOT RESTART AUTOMATICALLY AFTER A POWER FAILURE.

COOLING TOWERS SEQUENCE OF OPERATION

UPON ACTIVATION OF THE CALL FOR A CHILLER, THE ASSOCIATED CONDENSER WATER PUMP SHALL START, THE FIRST COOLING TOWER CELL SHALL BE ENERGIZED AND BOTH COOLING TOWER CELL ISOLATION VALVES SHALL OPEN. UPON A RISE IN LEAVING CONDENSER WATER TEMPERATURE TO 75° F BOTH FANS OF THE ASSOCIATED COOLING TOWER CELL SHALL START. BOTH COOLING TOWER FANS SHALL BE MODULATED IN PARALLEL TO MAINTAIN A CONSTANT LEAVING WATER TEMPERATURE OF 75° F. ALL TEMPERATURE CONTROLLERS SHALL SHALL VARIABLE SETPOINTS.

IF THE CONDENSER WATER PUMP FAILS AN ALARM SHALL BE ENERGIZED.

THE LEAD COOLING TOWER CELLS SHALL BE ALTERNATED ON A WEEKLY BASIS.

COOLING TOWER BASIN MAKEUP SHALL BE OPERATED BY A MANUFACTURER SUPPLIED BASIN FLOAT VALVE.

ON A DROP IN TOWER BASIN WATER TEMPERATURE TO 40 F AN ALARM SHALL BE ENERGIZED, CT BASIN HEATERS SHALL BE ENERGIZED, AND CONDENSER WATER PIPE HEAT TRACING SHALL BE ENERGIZED.

PIPING SYSTEM HEAT TRACING
UPON A DROP IN PIPE TEMPERATURE TO 40 DEG F, THE PIPE HEAT TRACING SHALL BE ENERGIZED.

REFRIGERANT MONITOR SEQUENCE OF OPERATION
REFRIGERANT MONITOR RDM-1 SHALL CONTINUOUSLY SAMPLE BOTH ZONES (EAST ROOM AND WEST ROOM). UPON DETECTION OF REFRIGERANT IN THE EAST ROOM, DAMPER CD-1 SHALL STROKE FULL OPEN, DAMPER CD-2 SHALL STROKE FULL CLOSED, (E) EXHAUST FAN EF-17 SHALL BE ENERGIZED, AND AN ALARM SHALL BE SENT TO THE BUILDING CONTROL SYSTEM. UPON DETECTION OF REFRIGERANT IN THE WEST ROOM, DAMPER CD-2 SHALL STROKE FULL CLOSED, DAMPER CD-3 SHALL STROKE FULL OPEN, EXHAUST FAN EF-17B SHALL BE DE-ENERGIZED, EXHAUST FAN EF-17A SHALL BE ENERGIZED, AND AN ALARM SHALL BE SENT TO THE BUILDING CONTROL SYSTEM.

VENTILATION FAN SEQUENCE OF OPERATION
EXHAUST FAN EF-17B SERVES THE VENTILATION REQUIREMENT FOR BOTH THE EAST AND WEST ROOMS IN THE POWER PLANT. THERMOSTATS T-1 (EAST ROOM) AND T-2 (WEST ROOM) SHALL BE MONITORED. UPON A RISE IN TEMPERATURE IN EITHER SPACE TO 94 DEG F, EXHAUST FAN EF-17B SHALL BE ENERGIZED, AND DAMPERS CD-1, CD-2, AND CD-3 SHALL OPEN. VFD SHALL MODULATE FAN SPEED AS NECESSARY TO MAINTAIN SETPOINT.

NOTE: EXISTING CONTROL DEVICES TO REMAIN, PROGRAMMING, ETC. FOR THIS EQUIPMENT IS VIA EXISTING JOHNSON NAE. IF CONTRACTOR UTILIZES JOHNSON CONTROLS SYSTEM, EXISTING CONTROLLERS, PROGRAMMING, ETC. TO REMAIN. IF AUTOMATED LOGIC (ON OTHER) HEAD-IN SYSTEM IS UTILIZED, MODIFY/ REPLACE COMPONENTS, RE-PROGRAM, ETC. AS REQUIRED TO MATCH EXISTING.

POINT MATRICES

MATRICES AND/OR POINTS SHOWN IN THIN ARE EXISTING TO REMAIN. VERIFY ALL (E) POINTS, DEVICES, AND SENSORS, AND PROVIDE AS NECESSARY.

(E) P-1

SYSTEM	(E) PRIMARY CHILLED WATER PUMP CCU-1
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP STATUS	AI	HARD-WIRED CURRENT TRANSDUCER

P-2

SYSTEM	PRIMARY CHILLED WATER PUMP CCU-2
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP STATUS	AI	HARD-WIRED CURRENT TRANSDUCER

P-5

SYSTEM	PRIMARY CHILLED WATER PUMP CCU-3
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP STATUS	AI	HARD-WIRED CURRENT TRANSDUCER

P-6

SYSTEM	CONDENSER WATER PUMP CCU-2
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP STATUS	AI	HARD-WIRED CURRENT TRANSDUCER

P-7

SYSTEM	CONDENSER WATER PUMP CCU-2
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP STATUS	AI	HARD-WIRED CURRENT TRANSDUCER

P-1

SYSTEM	SCHW PUMP (B47)
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

P-2

SYSTEM	SCHW PUMP (B47)
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

P-3

SYSTEM	SCHW PUMP (B47)
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

(E) P-3

SYSTEM	(E) SCHW PUMP (POWER PLANT)
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

(E) P-4

SYSTEM	(E) SCHW PUMP (POWER PLANT)
DESCRIPTION	TYPE	DEVICE
PUMP START/STOP	DO	HARD-WIRED
PUMP SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

SCHWS/R

SYSTEM	SECONDARY CHILLED WATER LOOP (CLINICAL ADDTN)
DESCRIPTION	TYPE	DEVICE
SCHWS TEMP	AI	HARD-WIRED
SCHWR TEMP	AI	HARD-WIRED
SCHWS FLOW	DI	HARD-WIRED
LOOP DIFF PRESS	AI	HARD-WIRED

SCHWS/R

SYSTEM	SECONDARY CHILLED WATER LOOP (MAIN HOSPITAL)
DESCRIPTION	TYPE	DEVICE
SCHWS TEMP	AI	HARD-WIRED
SCHWR TEMP	AI	HARD-WIRED
SCHWS FLOW	DI	HARD-WIRED
LOOP DIFF PRESS	AI	HARD-WIRED

PCHWS/R

SYSTEM	PRIMARY/SECONDARY INTERFACE
DESCRIPTION	TYPE	DEVICE
CHW FLOW	AI	HARD-WIRED
CHW DIRECTION	DI	HARD-WIRED

RDM-1

SYSTEM	REFRIGERANT MONITOR
DESCRIPTION	TYPE	DEVICE
WEST ROOM PPM	AI	HARD-WIRED
EAST ROOM PPM	AI	HARD-WIRED
ALARM	DI	HARD-WIRED

(E) CCU-1

SYSTEM	500 TON CENTRIFUGAL CHILLER
DESCRIPTION	TYPE	DEVICE
CHILLER START/STOP	DO	HARD-WIRED
CHWR FLOW SWITCH	DI	HARD-WIRED
CHWS TEMP	AI	HARD-WIRED
CHWR TEMP	AI	HARD-WIRED
CHWS FLOW	AI	HARD-WIRED
CWTT TEMP	AI	HARD-WIRED
CWFT TEMP	AI	HARD-WIRED
CWTT FLOW SWITCH	DI	HARD-WIRED
CHWS SETPOINT	AO	NETWORK
EVAP TEMP	AI	NETWORK
EVAP PRESSURE	AI	NETWORK
COND TEMP	AI	NETWORK
COND PRESSURE	AI	NETWORK
OIL TEMP	AI	NETWORK
OIL PRESSURE	AI	NETWORK
CURRENT LIMIT	AI	NETWORK
% kW	AI	NETWORK
STATUS	DI	NETWORK
ALARM	DI	NETWORK

CCU-2

SYSTEM	550 TON CENTRIFUGAL CHILLER
DESCRIPTION	TYPE	DEVICE
CHILLER START/STOP	DO	HARD-WIRED
CHWR FLOW SWITCH	DI	HARD-WIRED
CHWS TEMP	AI	HARD-WIRED
CHWR TEMP	AI	HARD-WIRED
CHWS FLOW	AI	HARD-WIRED
CWTT TEMP	AI	HARD-WIRED
CWFT TEMP	AI	HARD-WIRED
CWTT FLOW SWITCH	DI	HARD-WIRED
CHWS SETPOINT	AO	NETWORK
EVAP TEMP	AI	NETWORK
EVAP PRESSURE	AI	NETWORK
COND TEMP	AI	NETWORK
COND PRESSURE	AI	NETWORK
OIL TEMP	AI	NETWORK
OIL PRESSURE	AI	NETWORK
CURRENT LIMIT	AI	NETWORK
% kW	AI	NETWORK
STATUS	DI	NETWORK
ALARM	DI	NETWORK

CCU-3

SYSTEM	350 TON CENTRIFUGAL CHILLER
DESCRIPTION	TYPE	DEVICE
CHILLER START/STOP	DO	HARD-WIRED
CHWR FLOW SWITCH	DI	HARD-WIRED
CHWS TEMP	AI	HARD-WIRED
CHWR TEMP	AI	HARD-WIRED
CHWS FLOW	AI	HARD-WIRED
CWTT TEMP	AI	HARD-WIRED
CWFT TEMP	AI	HARD-WIRED
CWTT FLOW SWITCH	DI	HARD-WIRED
CHWS SETPOINT	AO	NETWORK
EVAP TEMP	AI	NETWORK
EVAP PRESSURE	AI	NETWORK
COND TEMP	AI	NETWORK
COND PRESSURE	AI	NETWORK
OIL TEMP	AI	NETWORK
OIL PRESSURE	AI	NETWORK
CURRENT LIMIT	AI	NETWORK
% kW	AI	NETWORK
STATUS	DI	NETWORK
ALARM	DI	NETWORK

CT-2

SYSTEM	INDUCED DRAFT COOLING TOWER
DESCRIPTION	TYPE	DEVICE
CT FAN 1 START/STOP	DO	HARD-WIRED
CT FAN 1 SPEED	DO	HARD-WIRED
CT FAN 1 VIBRATION SWITCH	DI	HARD-WIRED TO VFD
CT FAN 1 ON/OFF STATUS	DI	NETWORK
CT FAN 1 VFD IN BYPASS	DI	NETWORK
CT FAN 1 VFD ALARM	DI	NETWORK
CT FAN 1 ACTUAL SPEED	AI	NETWORK
CT FAN 1 POWER	AI	NETWORK
CT FAN 2 START/STOP	DO	HARD-WIRED
CT FAN 2 SPEED	DO	HARD-WIRED
CT FAN 2 VIBRATION SWITCH	DI	HARD-WIRED TO VFD
CT FAN 2 ON/OFF STATUS	DI	NETWORK
CT FAN 2 VFD IN BYPASS	DI	NETWORK
CT FAN 2 VFD ALARM	DI	NETWORK
CT FAN 2 ACTUAL SPEED	AI	NETWORK
CT FAN 2 POWER	AI	NETWORK
CT CELL 1 INLET VALVE	DO	HARD-WIRED
CT CELL 2 INLET VALVE	DO	HARD-WIRED
CT CELL 1 OUTLET VALVE	DO	HARD-WIRED
CT CELL 2 OUTLET VALVE	DO	HARD-WIRED
CT CELL 1 BYPASS	DO	HARD-WIRED
CT CELL 2 BYPASS	DO	HARD-WIRED
BASIN TEMP	AI	HARD-WIRED
HEAT TRACING STATUS	DI	HARD-WIRED MONITOR WITH CS
BASIN HEATER STATUS	DI	HARD-WIRED MONITOR WITH CS
CWFT TEMP	AI	HARD-WIRED
CWFT TEMP	AI	HARD-WIRED
AMBIENT TEMP	AI	HARD-WIRED

(E) EF-17

SYSTEM	(E) EXHAUST FAN (REFRIG PURGE) EAST ROOM
DESCRIPTION	TYPE	DEVICE
FAN START/STOP	DO	HARD-WIRED
FAN STATUS	AI	HARD-WIRED

EF-17A

SYSTEM	EXHAUST FAN (REFRIG PURGE) WEST ROOM
DESCRIPTION	TYPE	DEVICE
FAN START/STOP	DO	HARD-WIRED
FAN STATUS	AI	HARD-WIRED

EF-17B

SYSTEM	EXHAUST FAN (VENTILATION)
DESCRIPTION	TYPE	DEVICE
FAN START/STOP	DO	HARD-WIRED
FAN SPEED	AO	HARD-WIRED
ON/OFF STATUS	DI	NETWORK
VFD IN BYPASS	DI	NETWORK
ALARM	DI	NETWORK
ACTUAL SPEED	AI	NETWORK
POWER	AI	NETWORK

CD-1,2,3

SYSTEM	POWER PLANT AIR FLOW DAMPERS
DAMPER CD-1 OPEN	DO	HARD-WIRED NC DAMPER
DAMPER CD-2 OPEN	DO	HARD-WIRED NC DAMPER
DAMPER CD-3 OPEN	DO	HARD-WIRED NC DAMPER

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust control at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the government.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

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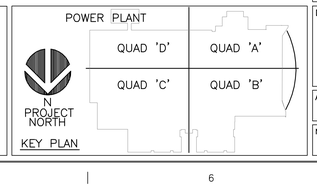

KEY PLAN

Drawing Title: CONTROL DIAGRAMS - CHILLER ROOM BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO.: M004

Dwg. 5 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities — Department of Veterans Affairs

SEQUENCE OF OPERATION

AREA SERVED: OFFICE, LABS, FIRST FLOOR

Air handling unit will be controlled from ECC when starter is placed in automatic position.
Exhaust fans E-1, E-2, E-4, E-5, E-7, E-8, E-10, E-11, E-13, E-14, E-15, E-16, E-17, E-18, E-27, E-29, E-30, E-34, E-35, E-36, E-43, E-46, E-47, E-56, E-60, and relief fan RF-1 are interlocked with A/C-1 to start and operate when it starts.
Air handling unit will operate continuously on schedule and modes directed by ECC. ← *UNLESS IN SMOKE CONTROL MODE.*
Existing freezestat will shut down fan on temperatures at water coil below 38°F. Chilled water pumps will start, and coil valves open to provide freeze protection.
Existing firestats in exhaust fan ducts will remain in service and will ~~shut down exhaust fan and activate signal to fire alarm system.~~ ← *ADVISE ECC OPERATOR (1-DI FOR ALL WIRED IN SERIES.)*
~~New smoke detectors installed in return (relief) and supply air streams will shut fan down and activate fire alarm system.~~
The ECC operator will be advised of fire/smoke condition and extent, and will have ability to override ~~smoke/fire detector and freezestat fan shutdown function and~~ start selected supply, exhaust and relief fans as may be appropriate for isolating fire zone, and smoke removal utilizing supply, relief and exhaust fans as may be appropriate in conjunction with outside air, exhaust air, return air and future smoke dampers to maintain fire zone at negative pressure, while providing positive pressurized air to adjacent areas and exhaust smoke and/or to purge zone or building of smoke. ← *FREEZE-STAT WILL NOT SHUT FAN DOWN IF IN SMOKE CONTROL MODE, BUT WILL ADVISE OPERATOR.*
Outside air fire and future smoke dampers close when fan is shut down and outside air damper opens to minimum ventilation position when fan operates and unit is not in economizer mode.
Heat run-a-round reclaim system pump will start when outside air is below 55° or above 83° and air handling system is in operation. Frost control will generally by-pass heat run-a-round reclaim coil below 32°.
Pre-heat steam coil will operate to maintain 50° *MAXIMUM* air temperature through modulation of normally open pre-heat steam supply valve.
Cold deck temperature will be maintained by reset schedule based on return air temperature and selected space sensors limits through modulation of chilled water valve and/or outside, return, and exhaust air dampers in economizer mode as outside air and return air enthalapy sensors select using both economizer cycle supplemented with chilled water when feasible to utilize minimum energy.
The relief air fan (RF-1) will start when system is in economizer mode, and shall operate for a 15 minute timed delay after economizer cycle is terminated.
A mixed air low limit sensor shall insure that mixed air temperature does not drop below 60°.
Hot deck temperature will be maintained utilizing a modulating steam coil with hot deck temperature being reset from outside air temperature space sensor or ECC logic.
The humidity sensor located in return air shall modulate humidifier steam valve and shall be limited by a high humidity sensor in cold deck supply.

When heat reclaim coils are in recovery and pre-heat mode, and A/C air handling unit is in economizer cooling mode, reclaim coil shall be by-passed to prevent undesired pre-heating.

SMOKE DETECTOR IN RETURN WILL PLACE A/H UNIT IN SMOKE CONTROL MODE, AND CONTINUE OPERATING, ADVISING OPERATOR. SUPPLY DECTECTOR WILL NOT SHUT FAN DOWN IF SMOKE SENSED IN R/A ALSO UNTIL UNIT HAS OPERERATED 5 MIN. IN SMOKE CONTROL MODE & OUTSIDE AIR BEING UTILIZED TO PRESSURIZE STILL CONTAIN SMOKE.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

AC-1
AREA SERVED: OFFICE, LABS, FIRST FLOOR

AC-1 may be started and stopped from the HOA on the motor starter or from the ECC. Twenty four exhaust fans (see list at left) are interlocked to start and stop with the supply fan.

On a command to start AC-1, the fire and smoke dampers will open. The supply fan and the twenty four exhaust fans will then start at five second intervals. Relief fan RF-1 will start when AC-1 is in the economizer mode and will continue to run for 15 minutes (adjustable) after the economizer is terminated.

When AC-1 is shut down, the outside air, fire, and smoke dampers will close and the return air damper will open. All control valves will assume their normal positions.

The minimum outside air damper (heat recovery side) will open when AC-1 is running and not in the economizer mode.

Freezestat (T-5) will shut down AC-1 if the mixed air temperature falls to 38°F. The chilled water pumps will start and coil valves will open to provide freeze protection. The exhaust fans will continue to run.

The unit smoke detectors, (SD-80) in the supply air, (SD-81) in the return air, and (SD-82) in the outside air intake of AC-2, will advise the operator if a smoke condition exists. Additionally: 1) return air detector (SD-81) will place AC-1 in the smoke control mode (the chilled water pumps will start, the coil valves will open, and the control dampers will be set for 100% outside air and exhaust; the freezestat (T-5) will be inoperative in this mode), 2) supply air detector (SD-80) and outside air detector (SD-82) will shut down AC-1 unless smoke is also detected in the return air (SD-81). In this case, AC-1 will shut down after five minutes if smoke is still present in the outside (supply) air.

Firestat (T-8) is wired in a series loop and will advise the ECC operator if a high temperature condition exists in any of the exhaust fans.
A SHUTDOWN OF AC-1 CAUSED BY A SMOKE/FREEZE CONDITION MAY BE OVERRIDDEN FROM THE ECC.
The heat recovery pump will start when AC-1 is in operation and the outside air temperature is below 55°F or above 83°F. The heat recovery coil (SC-3) will be by-passed when the outside air temperature is below 32°F or when the economizer mode is in operation.

Preheat steam valve (V-1) will modulate to maintain °F at temperature sensor (TT-2).

Three way chilled water valve (V-3) will modulate to maintain the cold deck temperature, which will be reset by the warmest temperature sensed by selected room sensors (TT-9, TT-10, and TT-11), or by the ECC operator.

If the outside air enthalpy is lower than the return air enthalpy, then the economizer mode will be activated, and the outside air, return air, and relief dampers will modulate in order to maintain a mixed air temperature equal to the cold deck setpoint.

Two way steam valve (V-4) will modulate to maintain the hot deck temperature, which will be reset by the coldest temperature sensed by selected room sensors (TT-8, TT-9, and TT-11), or by the ECC operator.

The humidifier steam valve (V-2) will modulate to maintain a return air relative humidity (HT-2) of % RH. A high limit humidistat (HT-1) will limit the operation of the humidifier.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

A/C-1

PARTIAL SEQUENCE OF OPERATION

Contractor to re-program ECC as required to satisfy new additions to operating sequence.

Air handling unit will operate in a VAV shutoff mode. Duct static pressure sensors located at fan discharge and 2/3 of way down stream of main trunks near last terminal unit will be used as inputs for cascade (proportional and integral) control algorithm for ECC to control static pressure by varying fan speed through a solid state inverter-variable voltage, variable frequency controller, supplying standard (existing) A-C induction motor drive.

Relief air fan shall track supply fan (when activated for economizer mode) by varying fan speed through a solid state inverter-variable voltage, variable frequency controller, supplying standard (existing) A-C induction motor drive. ECC to control fan speed based on air flow measuring device readings to maintain relief air volume at a preset level below supply air volume. (Set relief fan to maintain 24,000 CFM less than supply fan.)

Economizer sequence to function such that relief fan will not start until unit is in full economizer mode with return air damper fully closed and outside and relief air dampers fully open.

On activation of fire alarm system or smoke control purge mode all VAV boxes will go to the full open position to cold deck.

New static pressure sensor in fan plenum to stop fan on excessive negative static pressure with manual reset.

New steam control valve serving new convertor and new hot water pump to be controlled by ECC to provide hot deck discharge air temperature from new hot water reheat coil subject to outside air reset with hot water supply high limit. UTILIZE PID CONTROL TO ACHIEVE CLOSE TEMPERATURE CONTROL.

Damper operation to be coordinated with fan operation to allow fans to coast to a stop prior to closing dampers and to open dampers on fan activation as fan speeds up.

FROM "'91 RECORD DWGS." - ENERGY REDUCTION PROJECT #2
NOT TO SCALE

A/C-3 & HV-1

SEQUENCE OF OPERATION

AREAS SERVED: A/C-3 - BASEMENT FLOOR; HV-1 - WAREHOUSE, GENERAL STORAGE, BASEMENT (100% OUTSIDE AIR)

Air handling unit A/C-3 will be controlled from ECC when starter is placed in automatic position.
Exhaust fans E-37, E-52, E-53, and E-54 and relief fan RF-2 are interlocked with A/C-3 to start and operate when it starts.
Air handling unit will operate continuously on schedule and modes directed by ECC. ← *UNLESS IN SMOKE CONTROL MODE.*
Existing freezestat will shut down fan on temperature at water coil below 38°F. Chilled water pumps will start, and coil valves open to provide freeze protection.
Existing firestats to exhaust fan ducts will ~~remain in service and will shut down exhaust and activate signal to fire alarm system.~~ ← *WILL ADVISE ECC OPERATOR (1-DI FOR ALL IN SERIES.*
~~New smoke detectors installed in return (relief) and supply air steams will shut fan down and activate fire alarm system.~~
The ECC operator will be advised of fire/smoke condition and extent, and will have ability to override smoke/fire detector and freezestat fan shutdown function and start selected supply exhaust and relief fans as may be appropriate for isolating fire zone, and smoke removal utilizing supply, relief and exhaust fans as may be appropriate in conjunction with outside air, exhaust air, return air and future smoke dampers to maintain fire zone at negative pressure while providing positive pressurized air to adjacent areas and exhaust smoke and/or to purge zone or building of smoke.
Outside air dampers close when fan is shut down and open to minimum ventilation position when fan operates and unit is not in economizer mode.
Heat run-a-round reclaim system pump will start when outside air is below 55° or above 83° and air handling system is in operation. Frost control will generally by-pass heat run-a-round reclaim coil below 32°.
Pre-heat steam coil will operate to maintain 50° *MAXIMUM* air temperature through modulation of normally open pre-heat steam supply valve.
Cold deck temperature will be maintained by reset schedule based on return air temperature and selected space sensors limits through modulation of chilled water valve and/or outside, return, and exhaust air dampers in economizer mode as outside air and return air enthalapy sensors select using both economizer cycle supplemented with chilled water when feasible, to utilize minimum energy.
The relief air fan (RF-2) will start when system is in economizer mode, and shall operate for a 15 minute timed delay after economizer cycle is terminated.
A mixed air sensor shall insure that mixed air temperature does not drop below 60°.
Hot deck temperature will be maintained utilizing a modulating steam coil with hot deck temperature being reset from outside air temperature, space sensor or ECC logic.
The humidity sensor located in return air duct shall modulate humidifier steam valve and shall be limited by a high humidity sensor in cold deck supply.
HV-1 air handling unit will be controlled from ECC when starter is placed in automatic position, or selected local control shall provide OFF-AUTO-HI-LOW selection switch.
Exhaust fans E-3, E-38, E-42, E-43, and E-44 are interlocked with HV-1 to start and operate when it operates.
HV-1 fan will operate in slow speed when outside temperature is below 45° and high speed above 45°.
By-pass damper is closed when HV-1 is off or on low speed, and opens when fan runs on high speed.
The existing freezestat will shut down fan on temperatures below 32°F and open steam valve.
Smoke detector in exhaust air duct and supply air stream will shut fan down and activate fire alarm system.
The ECC operator will be advised of fire/smoke condition and will have ability to override smoke/fire detector fan shut down function and start selected fan as may be appropriate to purge zone of smoke.
Outside air dampers close when fan is shut down.
Heat reclaim run-a-round system pump will start when outside air is below 55° or above 83° and air handling system is in operation. Frost control will generally by-pass heat run-a-round reclaim coil below 32°.
Pre-heat steam coil will operate to maintain discharge air temperature setpoint, by modulating steam valve. Setpoint will be reset by ECC based on room temperature sensor.
Discharge air temperature will be limited to a low of 65°F.
The humidity sensor located in Fan E-44 exhaust duct shall control steam valve.

When heat reclaim coils are in recovery and pre-heat mode, and A/C air handling unit is in economizer cooling mode, reclaim coil shall be by-passed to prevent undesired pre-heating.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

A/C - 2

SEQUENCE OF OPERATION

AREA SERVED: OFFICES, LABS, FIRST FLOOR AND BASEMENT (100% OUTSIDE AIR)

Air handling unit will be controlled from ECC when starter is placed in automatic position.
Exhaust fans E-9, E-12, E-19, E-20, E-21, E-22, E-23, E-24, E-31, E-32, E-33, E-48, E-50, and E-55 are interlocked with A/C-2 to start and operate when it starts.
Air handling unit will operate continuously on schedule and modes directed by ECC. ← *UNLESS IN SMOKE CONTROL MODE*
Existing freezestat will shut down fan on temperatures at water coil below 38°F. Chilled water pumps will start, and coil valves will open to provide freeze protection.
Existing firestats in exhaust fan ducts will remain in service and will ~~shut down exhaust fan and activate signal to fire alarm system.~~ ← *ADVISE ECC OPERATOR (1-DI FOR ALL WIRED IN SERIES.*
SEE NOTE DWG # 47-EM2 → ~~New smoke detector installed in supply air stream and future detectors to be installed in exhaust air streams will shut down fan and activate fire alarm system.~~
The ECC operator will be advised of fire/smoke condition and extent, and will have ability to override smoke/fire detector and freezestat fan shutdown function and start selected supply and/or exhaust fans as may be appropriate for isolating fire zone, and smoke removal utilizing supply, and exhaust fans as may be appropriate in conjunction with outside air and exhaust air and future smoke dampers to maintain fire zone at negative pressure, while providing positive pressured air to adjacent areas and exhaust smoke and/or to purge zone or building of smoke.
Outside air dampers close when fan is shut down and opens when fan is operating.
Heat run-a-round reclaim system pump will start when outside air is below 55° or above 83° and air handling system is in operation. Frost control will generally by-pass heat run-a-round reclaim coil below 32°.
Pre-heat primary and secondary steam coils will operate to maintain 50° *MAXIMUM* air temperature through modulation of normally open pre-heat steam supply valves in sequence.
Cold deck temperatures will be maintained by reset schedule based on space temperature sensors by ECC through modulation of chilled water valve.
Hot deck temperature will be maintained utilizing a modulating steam coil with hot deck temperature being reset from outside air, space sensor or ECC logic.
The humidity sensor located in exhaust duct from space E-145 will modulate humidifier steam valve and shall be limited by a high humidity sensor in cold deck supply.

When heat reclaim coils are in recovery and pre-heat mode, and A/C air handling unit is in economizer cooling mode, reclaim coil shall be by-passed to prevent undesired pre-heating.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

SEQUENCE OF OPERATION
AC-2
AREA SERVED: OFFICE, LABS, FIRST FLOOR AND BASEMENT

AC-2 may be started and stopped from the HOA on the motor starter or from the ECC. Fourteen exhaust fans (see list on drawing) are interlocked to start and stop with the supply fan.

On a command to start AC-2, the outside air, fire and smoke dampers will open. The supply fan and the fourteen exhaust fans will then start at five second intervals.

When AC-2 is shut down, the outside air, fire, and smoke dampers will close. All control valves will assume their normal positions.

Freezestat (T-41) will shut down AC-2 if the preheated air temperature falls to 38°F. The chilled water pumps will start and all coil valves will open to provide freeze protection. The ECC operator will be advised of a freeze condition.

The unit smoke detectors, (SD-83) in the supply air and (SD-82) in the outside air will advise the ECC operator if a smoke condition exists and will place AC-2 in the smoke control mode (the chilled water pumps will start, the coil valves will open, and the freezestat (T-41) will be inoperative). AC-2 will shut down after five minutes if smoke is still present in the outside (supply) air.
A SHUTDOWN OF AC-2 CAUSED BY A SMOKE/FREEZE CONDITION MAY BE OVERRIDDEN FROM THE ECC.
Firestats (T-43) are wired in a series loop and will advise the ECC operator if a high temperature condition exists in any of the exhaust fans.

The heat recovery pump will start when AC-2 is in operation and the outside air temperature is below 55°F or above 83°F. The heat recovery coil will be by passed when the outside air temperature is below 32°F.

Preheat steam valve (V-11) will modulate to maintain °F discharge temperature. Preheat steam valve (V-12) will modulate to maintain °F discharge temperature.

Three way chilled valve (V-14) will modulate to maintain the cold deck temperature which will be reset by the warmest temperature sensed by room sensors (TT-19, TT-20).

Two way steam valve (V-15) will modulate to maintain the hot deck temperature, which will be reset by the coldest temperature sensed by room sensors (TT-19, TT-20).

The humidifier steam valve (V-12) will modulate to maintain a space relative humidity of % RH. Humidity transmitter (HT-4) located in the exhaust duct of fan E-20 will control the humidifier. A high limit humidity sensor in the supply air (HT-3) will limit the operation of the humidifier.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

SEQUENCE OF OPERATION
AC-3
AREA SERVED: BASEMENT FLOOR

AC-3 may be started and stopped from the HOA on the motor starter or from the ECC. Exhaust fan E-37 is interlocked to start and stop with the supply fan.

On a command to start AC-3, the fire and smoke dampers will open. The supply fan and exhaust fan E-37 will then start at five second intervals. Relief fan RF-2 will start when AC-3 is in the economizer mode and will continue to run for 15 minutes (adjustable) after the economizer is terminated.

When AC-3 is shut down, outside air, fire, and smoke dampers will close and the return air damper will open. The control valves will assume their normal positions.

A shut down of AC-3 caused by a smoke/freeze situation may be overridden from the ECC.

The minimum outside air dampers will open to minimum position when AC-3 is running and not in the economizer mode.

Freezestat (T-30) will shut down AC-3 if the mixed air temperature falls to 38°F. The chilled water pump will start and all coil valves will open to provide freeze protection. The ECC operator will be advised of a freeze condition.

The unit smoke detectors, (SD-84) in the supply air, (SD-85) in the return air, and (SD-86) in the outside air will advise the operator if a smoke condition exists. Additionally: 1) return air detector (SD-85) will place AC-3 in the smoke control mode (the chilled water pumps will start, the coil valves will open, and the control dampers will be set for 100% outside air and exhaust; the freezestat (T-30) will be inoperative in this mode), 2) supply air detector (SD-84) and outside air detector (SD-86) will shut down AC-3 unless smoke is also detected in the return air (SD-85). In this case, AC-3 will shut down after five minutes if smoke is still present in the outside (supply) air.

Firestat (T-29) will advise the ECC operator if a high temperature condition exists in exhaust fan E-57.

The heat recovery pump will start when AC-3 is in operation and the outside air temperature is below 55°F or above 83°F. The heat recovery coil (SC-4) will be by-passed when the outside air temperature is below 32°F or when the economizer mode is in operation.

Preheat steam valve (V-6) will modulate to maintain °F discharge temperature. Preheat steam valve (V-8) will modulate to maintain °F discharge temperature.

Three way chilled water valve (V-9) will modulate to maintain the cold deck temperature, which will be reset by the warmest temperature sensed by selected room sensors (TT-29, TT-30) or by the ECC operator.

If the outside air enthalpy is lower than the return air enthalpy, then the economizer mode will be activated, and the outside air, return air, and relief dampers will modulate in order to maintain a mixed air temperature equal to the cold deck setpoint.

Two way steam valve (V-10) will modulate to maintain the hot deck temperature, which will be reset by the coldest temperature sensed by selected room sensors (TT-29, TT-30) or by the ECC operator.

The humidifier steam valve (V-7) will modulate to maintain a return air relative humidity (HT-6) of % RH. A high limit humidistat (HT-5) will limit the operation of the humidifier.

SEQUENCE OF OPERATION
HV-1
Area Served: Warehouse, General Storage, Basement

HV-1 may be started and stopped from the local control switch or from the ECC when the local switch is in the "Auto" position. Exhaust fans E-3, E-38, E-42, E-43 and E-44 are interlocked to operate with the supply fan.

HV-1 will operate at slow speed when the outside air temperature is below 55°F and high speed above 55°F. The outside air damper (D-2) will open when the unit starts and close when the unit stops.

Freezestat (T-16) will shut down HV-1 if the supply air temperature falls to 38°F. All coil valves will open to provide freeze protection. The ECC operator will be advised of a freeze condition.

Supply air smoke detector (SD-87) will shut down the unit and advise the ECC operator if smoke is detected.

Firestats (T-F) are wired in a series loop and will advise the ECC operator if a high temperature condition exists in any of the exhaust fans.

The heat recovery pump (see sheet 8) will start when HV-1 is operating and the outside air temperature is below 55°F or above 83°F. The three way control valve will by pass the coil if the outside temperature is below 32°F.

Preheat steam coil (V-5) will modulate to maintain *70* °F discharge temperature.

Humidity sensor (HT-7) will modulate the humidifier steam valve (V-H) to maintain the space relative humidity.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

A/C - 5

SEQUENCE OF OPERATION

AREAS SERVED: EAST, SOUTH, & WEST WINGS' PATIENT ROOMS (100% OUTSIDE AIR)

Air handling unit will be controlled from ECC when starter is placed in automatic position.
Exhaust fans E-25, E-39, E-40 and E-57 are interlocked with A/C-5 to start and operate when it starts. ← *EXHAUST FANS FROM PATIENTS TOILETS SHALL RUN CONTINUOUSLY, EVEN WHEN AIR HANDLER IS SHUT OFF, UNLESS SHUT OFF BY OPERATOR.*
Air handling unit will operate continuously on schedule directed by ECC. ← *UNLESS IN SMOKE CONTROL MODE*
Existing freezestat will shut down fan on temperatures at water coil below 38°F. Chilled water pumps will start and coil valves open to provide freeze protection.
Existing firestats in exhaust fan ducts will remain in service and will ~~shut down exhaust fan and activate signal to fire alarm system.~~ ← *ADVISE ECC OPERATOR (1-DI FOR ALL IN SERIES.)*
SEE NOTE DWG. # 47-EM2 → ~~New smoke detectors installed in exhaust air streams will shut fan down and activate fire alarm system.~~ *SUPPLY NOW AND IN FUTURE IN*
The ECC operator will be advised of fire/smoke condition, and extent and will have ability to override smoke/fire detector and freezestat fan shutdown.
Function and start selected supply, exhaust, and relief fans as may be appropriate for isolating fire zone, and smoke removal utilizing supply and exhaust fans as may be appropriate in conjunction with outside air and exhaust air and future smoke dampers to maintain fire zone at negative pressure while providing positive pressurized air to adjacent areas and exhaust smoke and/or to purge zone or building of smoke.
Outside air, fire and future smoke dampers close when fan is shut down.
Heat run-a-round reclaim system pump will start when outside air is below 55° or above 83°F and air handling system is in operation. Frost control will generally by-pass heat run-a-round reclaim coil below 32°F.
Pre-heat steam coil *AND FACE & BYPASS DAMPER* will operate to maintain 60°F minimum air temperature in cooling season and 75°F temperature during heating season reset by space temperature sensor.
Cold deck temperature will be maintained by reset schedule based on outside air temperature, discharge air temperature, and selected space sensors limits through modulation of chilled water valve.
A mixed air low limit sensor shall insure that mixed air temperature is as scheduled and does not drop below 50°.
The humidity sensors in Rooms A-513, A-517, and A-539 will be averaged to maintain 50% RH by modulation of steam valve to humidifier, a duct high limit sensor will limit to 85% RH.

When heat reclaim coils are in recovery and pre-heat mode, and A/C air handling unit is in economizer cooling mode, reclaim coil shall be by-passed to prevent undesired pre-heating.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

SEQUENCE OF OPERATION
AC-5
AREA SERVED: EAST, SOUTH, & WEST WING PATIENT ROOMS

AC-5 MAY BE STARTED AND STOPPED FROM THE HOA ON THE MOTOR STARTER OR FROM THE ECC. EXHAUST FANS E-25, E-39, E-40, AND E-57 ARE INTERLOCKED TO START AND STOP WITH THE SUPPLY FAN.

ON A COMMAND TO START AC-5, THE OUTSIDE, FIRE AND SMOKE DAMPERS WILL OPEN. THE SUPPLY FAN AND THE EXHAUST FANS WILL THEN START AT FIVE SECOND INTERVALS.

WHEN AC-5 IS SHUT DOWN, THE OUTSIDE AIR, FIRE, AND SMOKE DAMPERS WILL CLOSE. ALL CONTROL VALVES WILL ASSUME THEIR NORMAL POSITIONS.

FREEZESTAT (T-48) WILL SHUT DOWN AC-5 IF THE PREHEAT AIR TEMPERATURE FALLS TO 38 DEG F. THE CHILLED WATER PUMPS WILL START AND ALL COIL VALVES WILL OPEN TO PROVIDE FREEZE PROTECTION. THE ECC OPERATOR WILL BE ADVISED OF A FEEZE CONDITION. *FREEZESTAT WILL NOT SHUT DOWN THE UNIT DURING SMOKE CONTROL MODE.*

THE UNIT SMOKE DETECTOR (SD-92) IN THE SUPPLY AIR WILL ADVISE THE ECC OPERATOR IF A SMOKE CONDITION EXISTS AND WILL SHUT DOWN THE UNIT.

A SHUTDOWN OF AC-5 DUE TO A SMOKE/FREEZE CONDITION MAY BE OVERRIDDEN FROM THE ECC.

THE HEAT RECOVERY PUMP WILL START WHEN AC-5 IS IN OPERATION AND THE OUTSIDE AIR TEMPERATURE IS BELOW 55 DEG F. OR ABOVE 83 DEG F. THE HEAT RECOVERY COIL WILL BE BY PASSED WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 32 DEG F.

IN THE HEATING SEASON PREHEAT STEAM VALVE (V-16) WILL OPEN IF THE DISCHARGE TEMPERATURE FALLS BELOW 75 DEG F. THE FACE AND BY PASS DAMPERS WILL MODULATE TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 75 DEG F.

IN THE COOLING SEASON, CHILLED WATER VALVE (V-19) WILL MODULATE TO MAINTAIN THE SUPPLY AIR SETPOINT WHICH IS RESET FROM SPACE TEMPERATURE SENSORS.

ROOM HUMIDITY SENSORS (H12, 13, & 14) ARE AVERAGED AND WILL CONTROL THE HUMIDIFIER STEAM VALVE (V-18) TO MAINTAIN 50% RH. A HIGH LIMIT HUMIDISTAT IN THE DISCHARGE AIR WILL LIMIT THE OPERATION OF THE HUMIDIFIER.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the govenment.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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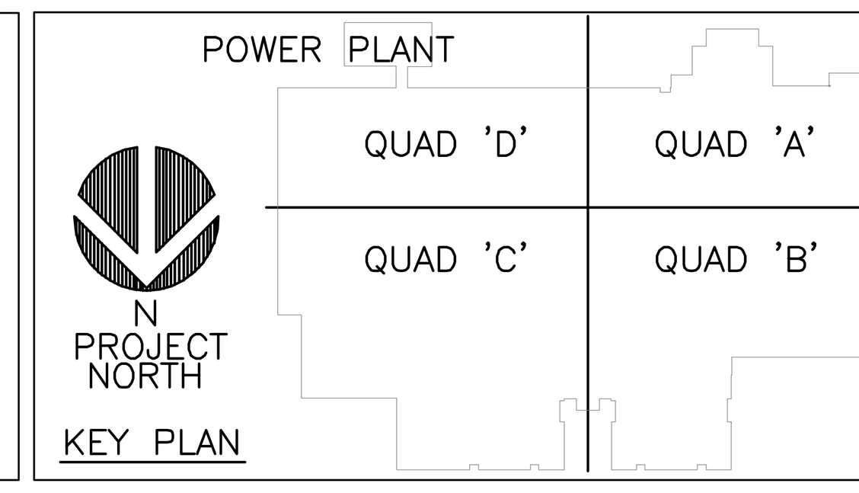

KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROLS SEQUENCE OF OPERATION BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M005
Dwg. 6 of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs

1 2 3 4 5 6 7 8 9

A/C - 6

SEQUENCE OF OPERATION

AREAS SERVED: OPERATING SUITES (100% OUTSIDE AIR)

Air handling unit will be controlled from ECC when starter is placed in automatic position.
Exhaust fan EF-41 (S interlocked with A/C-6 to start and operate when it starts. — UNLESS IN SMOKE CONTROL MODE.
Air handling units will operate continuously on schedule and modes directed by ECC.
Existing freezestat will shut down fan on temperatures at water coils below 38°. Chilled water pumps will start and coil valves will open to provide freeze protection.
Existing firestat and smoke detectors in exhaust and supply ducts will remain in service and will shut down exhaust and/or air handling supply fan and activate signal to fire alarm system. Smoke detectors may be reset by operator from ECC. — SEE NOTE DWG.# 47-EM2
Additional alarms will be provided for O.R. auxiliary chiller compressors No. 1 and No. 2 lockout, pre-heat low temperature, final filter clogged, and roll filter media run-out. (CONTINUED AT RIGHT)

ECC will select from five operating modes: Automatic, normal cooling (main chiller plant only), auxiliary cooling (auxiliary chiller only when main plant down), supplemental cooling (both chillers main first, auxiliary supplementing as needed without causing main chiller plant to operate for just O.R. load or causing chilled water from main plant to be reset down below load needs in rest of hospital just for O.R. zones), emergency cooling (all C.W. pumps [including trans-injection pump] and all chillers available operating).
ECC will start and stop auxiliary chiller and respective pumps automatically as O.R. load and schedule dictate.
When A/H-6 fan is on outside air and fire dampers will open. Freezestat operation will normally stop A/H fan and close dampers, unless being used for smoke removal mode.
The ECC operator will be advised of fire/smoke conditions and extent, and will have ability to override smoke/fire detectors and freezestat fan shutdown function to start selected supply and/or exhaust fan as appropriate for smoke removal.
Heat recovery run-a-round coil will transfer energy when system is operating.
Pre-heat steam valve and face and by-pass coil/damper will operate to maintain 50° temperature.
A/H-6 discharge air temperature will be reset based on space temperature and requirements in zones, as function of hottest zone.
When outside air is not sufficient to satisfy cooling needs, the chilled water valves will modulate.
If main chiller plant is operating, cooling coil CC-6B will provide cooling if not adequate to satisfy load needs cooling coil CC-6A will be sequenced to supplement. Auxiliary O.R. chiller will be switched on along with respective chilled water pumps.
If main chiller plant is not operating, auxiliary chiller will provide cooling needs as described above.
Humidity sensor in Room A-270 will modulate humidifier steam valve and shall be limited by a high limit sensor in discharge air duct, to 85% R.H.
The thirteen individual operating rooms and auxiliary spaces shall each have sensors to monitor and control temperature and RH, sensors located behind R/A grill in respective spaces.
A/H-6 discharge air will be reset down as needed to maintain O.R. setpoints. When main chiller is operating, C.W. valve signal will reset chilled water supply from main chiller plant down. When O.R. only zone requiring chilled water or main chiller plant down then auxiliary chiller and associated C.W. valve will be reset and controlled.
Re-heat coil 3-way valves will be modulated as needed to control temperature and/or humidity. Zone humidifier steam valve will be modulated to add humidity when needed.
A/H-6 discharge air temperature will be lowered and re-heat coil utilized as needed to reduce zone humidity.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

SEQUENCE OF OPERATION
AC-6
AREAS SERVED: OPERATING SUITES

AC-6 MAY BE STARTED AND STOPPED FROM THE HOA ON THE MOTOR STARTER OR FROM THE ECC. EXHAUST FAN E-41 IS INTERLOCKED TO START AND STOP WITH THE SUPPLY FAN.

WHEN AC-6 IS SHUTDOWN, THE FIRE, SMOKE, AND OUTSIDE AIR DAMPERS WILL CLOSE AND THE CONTROL VALVES WILL ASSUME THEIR NORMAL POSITIONS.

FREEZESTAT(T-58) WILL SHUTDOWN AC-6 IF THE PREHEAT AIR TEMPERATURE FALLS TO 38 DEG F. THE CHILLED WATER PUMPS WILL START AND ALL COIL VALVES WILL OPEN TO PROVIDE FREEZE PROTECTION. THE ECC OPERATOR WILL BE ADVISED OF A FREEZE CONDITION.

THE SUPPLY AIR SMOKE DETECTOR (SD-93) WILL SHUT DOWN AC-6 AND ADVISE THE ECC OPERATOR IF SMOKE IS DETECTED.

A SHUTDOWN OF AC-6 BY A SMOKE/FREEZE SITUATION MAY BE OVERRIDDEN FROM THE ECC.

THE HEAT RECOVERY PUMP WILL OPERATE WHEN THE SYSTEM IS OPERATING AND THE OUTSIDE AIR TEMPERATURE IS BELOW 55 DEG. F OR ABOVE 83 DEG. F.

THE PREHEAT STEAM VALVE (V-20) WILL OPEN IF THE COIL DISCHARGE TEMPERATURE FALLS BELOW 50 DEG. F. THE FACE AND BY PASS DAMPERS WILL MODULATE TO MAINTAIN A DISCHARGE AIR TEMPERATURE OF 50 DEG. F.

IF THE MAIN CHILLER PLANT IS OPERATING, CHILLED WATER VALVE (V-21) WILL MODULATE TO MAINTAIN THE DESIRED SUPPLY AIR TEMPERATURE. IF THE MAIN CHILLER PLANT IS NOT OPERATING, OR IF ADDITIONAL COOLING IS NEEDED, THE AUXILLARY CHILLER WILL BE STARTED ALONG WITH THE ASSOCIATED CHILLED WATER PUMPS AND CHILLED WATER VALVE (V-22) WILL BE MODULATED AS REQUIRED.

AC-6 SUPPLY AIR TEMPERATURE WILL BE RESET FROM THE WARMEST O.R. ROOM.

HUMIDITY SENSOR (H-18) IN ROOM A-270 WILL MODULATE THE HUMIDIFIER VALVE (V-23) TO MAINTAIN 50% RH. A HUMIDITY HIGH LIMIT IN THE SUPPLY AIR WILL LIMIT THE DISCHARGE AIR RH TO 85%.

REHEAT COILS AND ZONE HUMIDIFIERS (SEE SCHEDULE ABOVE) WILL MAINTAIN ZONE CONDITIONS OF DEG. F % RH.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

H/V -2

SEQUENCE OF OPERATION

AREA SERVED: KITCHEN (100% OUTSIDE AIR)

Heating ventilating unit will be controlled from ECC when starter is placed in automatic position.
Heating ventilating unit will operate continuously on scheduled directed by ECC.
Existing firestats in exhaust fans #E-26 and E-28 ducts will remain in service to shut down exhaust fan, H/V-2 fan and signal fire alarm system.
New smoke detector installed in H/V unit's discharge air duct will shut fan down and activate fire alarm system.
The ECC operator will be advised of fire/smoke condition and will have ability to override smoke/fire detector fan shut-down function and start selected supply or exhaust fans as may be appropriate for smoke removal.
When H/V-2 fan is shut down for unoccupied night mode outside air damper will close.
Pre-heat coils will be modulated and sequenced to maintain space temperature, fan to operate on high or low speed generally for heating mode.
The humidity sensor located in exhaust fan E-28 duct will modulate humidifier steam valve as required to control minimum humidity.
When space temperature increases, H/V-2 fan will operate on slow and/or fast speed to ventilate. Kitchen personnel will have ability to override fan speed selected by ECC logic and run fan on slow, fast or off as desired, manually during authorized time schedules.
H/V-2 unit will be shut down at night. Room sensor will activate if needed to maintain minimum 40° space temperature, during unoccupied times.
Fan E-2 will operate when HV-2 operates. It will select speed same as HV-2.
Range hood fan E-26 cannot operate unless HV-2 is operating. A local control speed selection switch will be installed adjacent to hood to allow operator to start/stop and select speed of fan.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

HV-2
Area Served: Kitchen

HV-2 may be started and stopped from the local control switch or from the ECC when the local switch is in the "Auto" position. Exhaust fan E-28 will operate at the same speed as HV-2.

HV-2 will operate on low speed if the outside air temperature is below 55°F, and high speed above 55°F. The outside air damper (D-10) will open when the unit starts and close when the unit stops.

E-26 will not operate unless HV-2 is operating. A local control switch will select the speed of the fan.

HV-2 will start if the space temperature falls below 40°F.

Freezestat (T-76) will shut down HV-2 if the supply air temperature falls below 38°F. All coil valves will open to provide freeze protection. The ECC operator will be advised of a freeze condition.

Supply air smoke detector (SD-88) will shut down the unit and advise the ECC operator if smoke is detected.

Firestats (T-78, T-79) are wired in a series loop and will advise the ECC operator if a high temperature condition exists in any of the exhaust fans.

Room temperature sensor (TT-34) will control the preheat coil valve (V-35) and the cooling coil valve (V-36) to maintain space temperature. Temperature sensor (TT-32) will maintain a minimum discharge temperature of 55°F.

Humidity sensor (HT-8) will modulate the humidifier steam valve (VH) to maintain the space relative humidity.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

SEQUENCE OF OPERATION

AUXILLARY CHILLER

IN THE AUTOMATIC MODE, THE ECC WILL SELECT THE CHILLER(S) COMBINATION FOR MOST EFFICIENT OPERATION. THE AUXILLARY CHILLER WILL BE STARTED IF:

1. AC-6 REQUIRES COOLING AND THE MAIN CHILLER PLANT IS DOWN.
2. AC-6 REQUIRES MORE COOLING THAN THE MAIN CHILLER PLANT CAN PROVIDE.

IN THE MANUAL MODE, THE ECC OPERATOR MAY START OR STOP THE AUXILLARY CHILLER AND ASSOCIATED WATER PUMPS AS DESIRED.

ON A SIGNAL TO START, THE CHILLED WATER PUMP (P-12 OR P-13 AS SELECTED BY THE OPERATOR) WILL START. AFTER FLOW IS PROVED THE AUXILLARY CHILLER WILL BE STARTED.

PUMP P-14 WILL BE STARTED IF THE MAIN CHILLER PLANT IS OPERATING, THE AUXILLARY CHILLER IS OPERATING, AND AC-6 REQUIRES MORE COOLING. A MESSAGE WILL BE SENT TO THE OPERATOR CONSOLE TO MANUALLY OPEN VALVES FOR THIS MODE AND TO CLOSE THEM WHEN THIS MODE IS TERMINATED.

PUMP P-15 WILL BE STARTED IF 2ND OR 4TH FLOOR ICU'S RISE ABOVE DEGREES.

FROM 12-23-86 RECORD DWGS. - "ENERGY MANAGEMENT SYSTEM"
NOT TO SCALE

AUXILIARY O.R. CHILLER

SEQUENCE OF OPERATION

AREA SERVED: OPERATING ROOM SUITE AND ICU'S

When A/C-6 (O.R.) and ICU units are operating and need more cooling than central chiller plant can provide, or if need cooling when main chiller plant down, then auxiliary chiller and chilled water pumps will start and operate.
Refer to A/C-6 Sequence of Operation.
In emergency cooling mode, chilled water pumps will operate and main system injection pump, P-14, will also operate. Operator will be advised by ECC to manually open valves and close when operation in this mode is terminated.
Chiller efficiency and cooling load will be monitored by ECC and operator advised when should start main chiller plant and allow auxiliary chiller system to revert to stand-by/supplemental mode.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

SEQUENCE OF OPERATION
ROOMS DB09 & DB06A

WHEN HV-2 IS OPERATING, ROOM DB09 TEMPERATURE AND HUMIDITY SENSORS (TT-93, HT-19) WILL CONTROL REHEAT COIL RH-8 STEAM VALVE (V-39) AND HUMIDIFIER H-11 VALVE TO MAINTAIN ROOM CONDITIONS OF DEGREES AND % RH.

ROOM DB06A WILL BE CONTROLLED SIMILARLY BY RETURN AIR SENSORS (TT-95 AND HT-21).

ALARMS A-1 THROUGH A-11 WILL BE DISPLAYED AT CONSOLE 1 AND 2 ON THE CRT AND WILL BE DOCUMENTED ON THE EVENT PRINTER.

EXISTING TEMPERATURE AND HUMIDITY CHART RECORDERS WILL REMAIN BUT WILL BE RECORDING ONLY INSTRUMENTS.

FROM POWERS CONTROLS AS-BUILTS - "'84-'86"
NOT TO SCALE

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the govenment.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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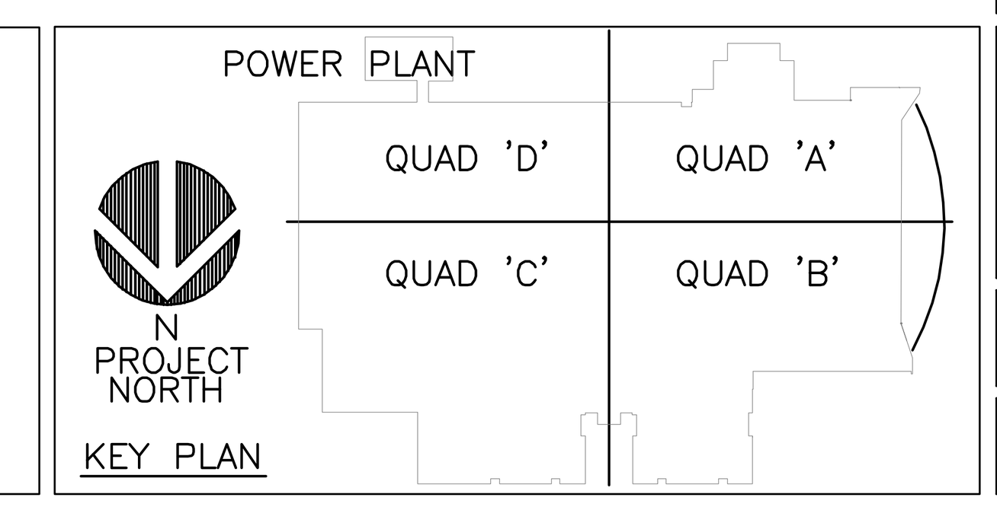


KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROLS SEQUENCE OF OPERATION BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No. 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M006

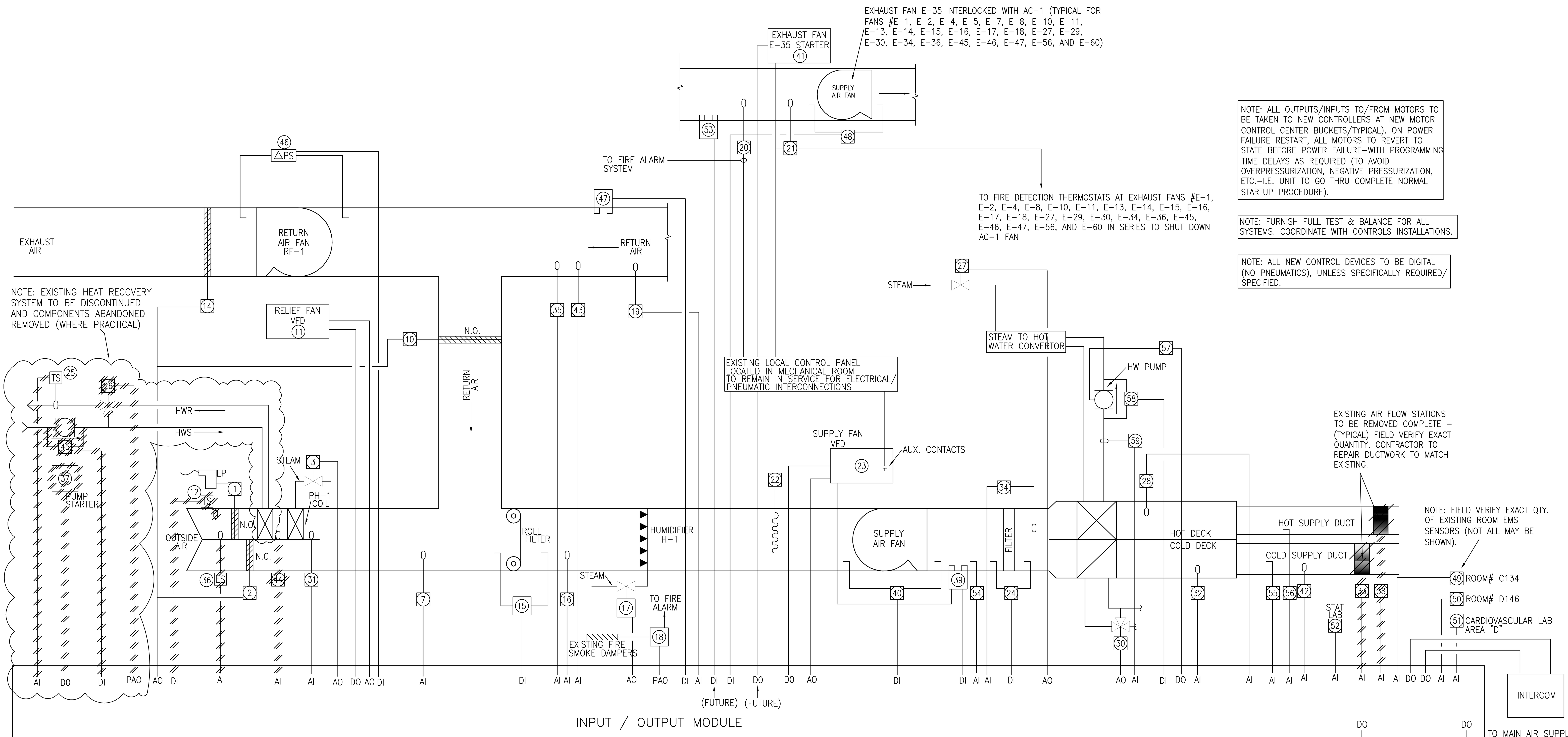
Dwg. 7 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Office of Facilities
Department of Veterans Affairs



NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE–WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.–I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).

NOTE: FURNISH FULL TEST & BALANCE FOR ALL SYSTEMS. COORDINATE WITH CONTROLS INSTALLATIONS.

NOTE: ALL NEW CONTROL DEVICES TO BE DIGITAL (NO PNEUMATICS), UNLESS SPECIFICALLY REQUIRED/ SPECIFIED.

1. EXISTING PNEUMATIC DAMPER ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR (MIN. O/A)
2. EXISTING ECONOMIZER PNEUMATIC DAMPER ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
3. EXISTING 2" N.O. STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
4. (NOT USED)
5. (NOT USED)
6. (NOT USED)
7. EXISTING FREEZE PROTECTION SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
8. (NOT USED)
9. (NOT USED)
10. EXISTING ECONOMIZER PNEUMATIC DAMPER ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
11. EXISTING RELIEF FAN VFD TO REMAIN (START / STOP & FAN SPEED VIA EMS).
12. EXISTING HEAT RECOVERY HIGH LIMIT THERMOSTAT TO BE REMOVED.
13. (NOT USED)
14. EXISTING PNEUMATIC DAMPER ACTUATOR FOR ECONOMIZER RELIEF DAMPER TO BE REPLACED WITH ELECTRONIC ACTUATOR.
15. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED WITH NEW.
16. NEW DUCT HUMIDITY SENSOR (MIXED AIR)
17. EXISTING HUMIDIFIER STEAM VALVE. ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
18. EXISTING FIRE DAMPER ACTUATOR TO REMAIN IN SERVICE, (FURNISH E/P RELAYS AS REQUIRED).
19. EXISTING HUMIDITY SENSOR TO BE REPLACED.
20. EXISTING SPDT ELECTRIC REMOTE BULB THERMOSTAT TO REMAIN IN SERVICE.
21. EXISTING FIRE DECTECTION THERMOSTAT TO REMAIN IN SERVICE.
22. EXISTING FREEZE DECTECTION THERMOSTAT TO BE REPLACED.
23. EXISTING SUPPLY FAN VFD TO REMAIN (START / STOP & FAN SPEED VIA EMS).
24. EXISTING DIFFERENTIAL PRESSURE SWITCH, TO BE REPLACED.
25. EXISTING HEAT RECOVERY LOOP TEMP SENSOR TO BE REMOVED.
26. EXISTING HEAT RECOVERY 3-WAY BYPASS VALVE OUTPUT TO BE REMOVED.
27. EXISTING 2-1/2" N.C. STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
28. EXISTING DRY BULB TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
29. (NOT USED)
30. EXISTING 6" 3-WAY CHILLED WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
31. NEW DUCT TEMP. SENSOR.
32. EXISTING DUCT SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
33. EXISTING AIR FLOW MEASURING STATION INPUT TO BE REMOVED.
34. EXISTING MIXED AIR SENSOR TO BE REPLACED WITH NEW TEMPERTURE SENSOR.
35. EXISTING ENTHALPY SENSOR TO BE REPLACED.
36. EXISTING ENTHALPY OUTSIDE AIR SENSOR TO BE REPLACED.
37. EXISTING HEAT RECOVERY COIL PUMP STARTER OUTPUT TO BE REMOVED.
38. EXISTING AIR FLOW MEASURING STATION INPUT TO BE REMOVED.
39. EXISTING DUCT SMOKE DETECTOR TO REMAIN.
40. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
41. EXISTING EXHAUST FAN STARTER TO REMAIN (TYP OF 24)
42. EXISTING DUCT HUMIDITY SENSOR TO BE REPLACED (HIGH LIMIT).
43. EXISTING DUCT TEMP. SENSOR TO BE REPLACED (R/A).
44. EXISTING DUCT TEMP. SENSOR TO BE REMOVED.
45. EXISTING DIFFERENTIAL PRESSURE SWITCH FOR HEAT RECOVERY PUMP TO BE REMOVED.
46. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED WITH NEW.
47. EXISTING DUCT SMOKE DETECTOR TO REMAIN.
48. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
49. EXISTING ROOM SENSOR LOCATED IN DIRECTOR'S OFFICE #C134 TO BE REPLACED. (FIELD VERIFY)
50. EXISTING ROOM SENSOR LOCATED IN GENERAL LAB #D146 TO BE REPLACED. (FIELD VERIFY)
51. EXISTING ROOM SENSOR LOCATED IN CARDIOVASCULAR LAB – AREA "D" TO BE REPLACED. (FIELD VERIFY)
52. EXISTING ROOM SENSOR LOCATED IN STAT LAB TO BE REPLACED. (FIELD VERIFY)
53. FUTURE SMOKE DETECTOR.
54. REPLACE EXISTING DUCT STATIC PRESSURE SENSOR
55. REPLACE EXISTING DUCT STATIC PRESSURE SENSOR LOCATED IN DUCT NEAR SURGICAL CLINICS AREA.
56. REPLACE DUCT STATIC PRESSURE SENSOR LOCATED IN DUCT NEAR SURGICAL CLINICS AREA
57. EXISTING PUMP STARTER TO REMAIN.
58. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
59. EXISTING WATER TEMP. SENSOR TO BE REPLACED.

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
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BUILDING IS FULLY SPRINKLERED

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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KEY PLAN: POWER PLANT; QUAD 'D'; QUAD 'A'; QUAD 'C'; QUAD 'B'; N PROJECT NORTH

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAM - A/C #1 BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No. 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

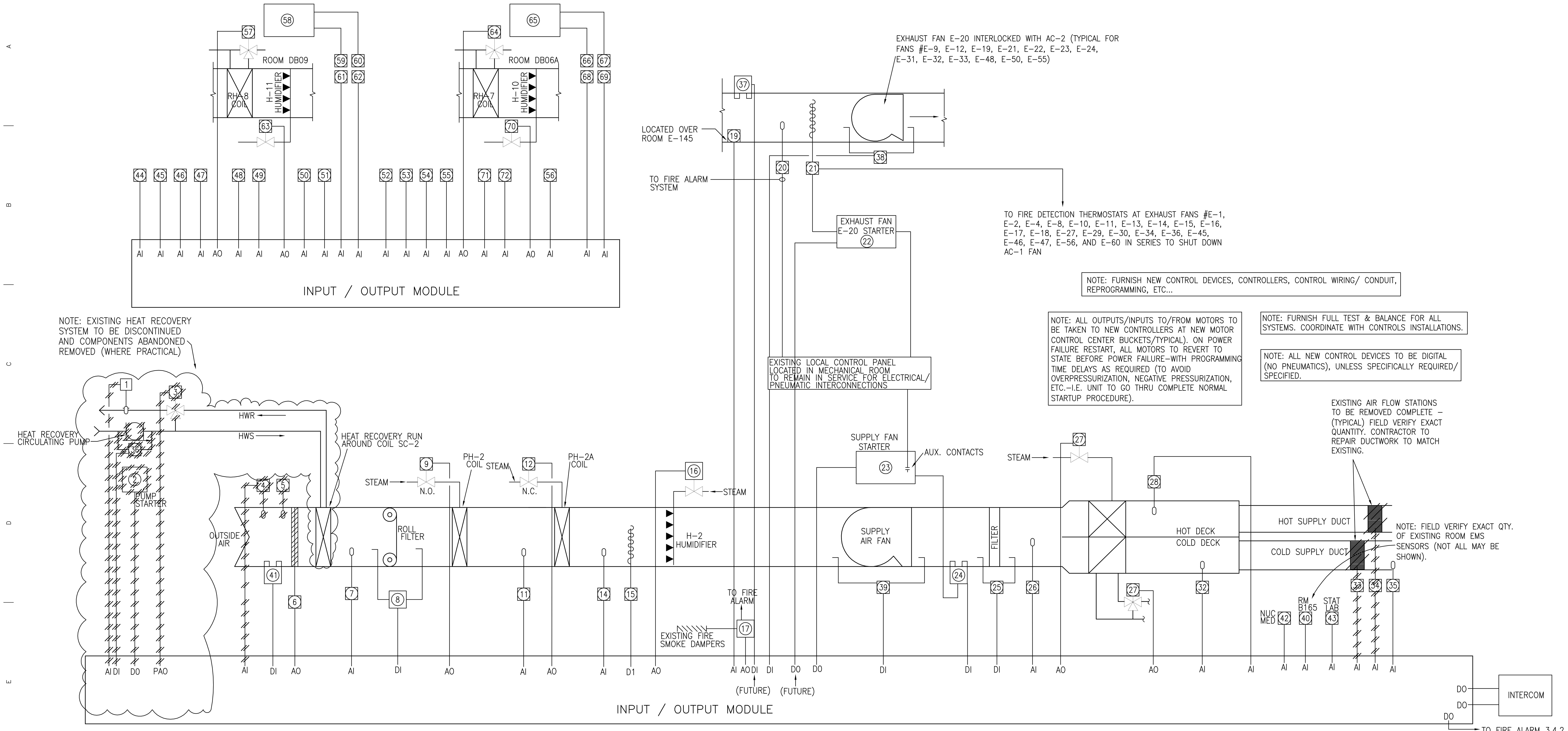
DRAWING NO. M101

Dwg. 8 Of 29

Location: ASHEVILLE, N.C.

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Office of Facilities
Department of Veterans Affairs



NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE-WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.-I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).

NOTE: FURNISH FULL TEST & BALANCE FOR ALL SYSTEMS. COORDINATE WITH CONTROLS INSTALLATIONS.

NOTE: ALL NEW CONTROL DEVICES TO BE DIGITAL (NO PNEUMATICS), UNLESS SPECIFICALLY REQUIRED/ SPECIFIED.

1. EXISTING HEAT RECOVERY WATER LOOP TEMPERATURE SENSOR TO BE REMOVED.
2. EXISTING HEAT RECOVERY COIL PUMP STARTER OUTPUT TO BE REMOVED.
3. EXISTING HEAT RECOVERY 3-WAY BYPASS VALVE OUTPUT TO BE REMOVED.
4. EXISTING TEMP SENSOR TO BE REMOVED.
5. (NOT USED).
6. EXISTING OUTSIDE AIR DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
7. EXISTING THERMOSTAT TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
8. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED WITH NEW.
9. EXISTING 2" N.O. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
10. (NOT USED)
11. EXISTING TEMPERATURE SENSOR TO BE REPLACED W/ NEW.
12. EXISTING 2" N.C. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
13. (NOT USED).
14. EXISTING TEMPERATURE SENSOR TO BE REPLACED W/ NEW.
15. EXISTING FREEZE DETECTION SENSOR TO BE REPLACED.
16. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
17. EXISTING FIRE DAMPER ACTUATOR TO REMAIN.
18. PNEUMATIC TO ELECTRIC TRANSDUCER TO REMAIN.
19. EXISTING PNEUMATIC HUMIDITY SENSOR TO REMAIN.
20. EXISTING SPDT ELECTRIC REMOTE BULB THERMOSTAT TO REMAIN IN SERVICE.
21. EXISTING FIRE DECTECTION THERMOSTAT TO REMAIN.
22. EXISTING EXHAUST FAN STARTER TO REMAIN. (TYPICAL OF 14)
23. EXISTING SUPPLY FAN STARTER TO REMAIN.
24. EXISTING DUCT SMOKE DETECTOR TO REMAIN.
25. EXISTING DIFFERENTIAL PRESSURE SWITCH, TO BE REPLACED.
26. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
27. EXISTING 1-1/2" N.C. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
28. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
29. (NOT USED).
30. EXISTING 6" N.C. 3-WAY CHILLED WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACT.
31. (NOT USED).
32. EXISTING ELECTRONIC TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
33. EXISTING AIR STATION TO BE REMOVED.
34. EXISTING AIR STATION TO BE REMOVED.
35. EXISTING ENTHALPY SENSOR TO BE REPLACED.
36. DIFFERENTIAL PRESSURE SENSOR TO BE REPLACED.
37. EXISTING DUCT SMOKE DETECTOR TO REMAIN (TYP. OF 14) (FUTURE)
38. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED. (TYP OF 14)
39. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED. (TYP OF 14)
40. EXISTING ROOM EMS SENSOR TO BE REPLACED (COORDINATE QUANTITY)- ANA. LAB
41. EXISTING DUCT DETECTOR TO REMAIN
42. EXISTING ROOM EMS SENSOR TO BE REPLACED (COORDINATE QUANTITY)- NUC. LAB
43. EXISTING ROOM EMS SENSOR TO BE REPLACED (COORDINATE QUANTITY) - STAT LAB
44. EXISTING ROOM EMS TEMP. SENSOR TO BE REPLACED (ROOM D103)
45. EXISTING ROOM EMS HUMIDITY SENSOR TO BE REPLACED (ROOM D103)
46. EXISTING ROOM DB06A FILTER ALARM (DP SWITCH) TO BE REPLACED.
47. EXISTING ROOM DB09 FILTER ALARM (DP SWITCH) TO BE REPLACED.
48. EXISTING ROOM MORGUE FILTER ALARM (DP SWITCH) TO BE REPLACED.
49. EXISTING RESERVE OXYGEN SENSOR / ALARM TO BE REPLACED.
50. EXISTING RESERVE NITROGEN OXIDE SENSOR / ALARM TO BE REPLACED.
51. EXISTING OXYGEN LOW PRESSURE SENSOR / ALARM TO BE REPLACED.
52. EXISTING NITROGEN OXIDE LOW SENSOR / ALARM TO BE REPLACED.
53. EXISTING MEDICAL AIR SENSOR / ALARM TO BE REPLACED.
54. EXISTING EMERGENCY GENERATOR OPER. ALARM TO BE REPLACED.
55. EXISTING EMERGENCY GENERATOR TROUBLE-OFF ALARM TO BE REPLACED.
56. EXISTING EMERGENCY GENERATOR PRE SIGN. ALARM TO BE REPLACED.
57. EXISTING N.O. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
58. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER / RECORDER TO BE REPLACED (MONITORING)
59. EXISTING ROOM TEMP SENSOR IN ROOM DB09 TO BE REPLACED
60. EXISTING ROOM HUMIDITY SENSOR IN ROOM DB09 TO BE REPLACED
61. EXISTING ROOM TEMP SENSOR IN ROOM DB09 TO BE REPLACED
62. EXISTING ROOM HUMIDITY SENSOR IN ROOM DB09 TO BE REPLACED
63. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
64. EXISTING N.O. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
65. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER / RECORDER TO BE REPLACED (MONITORING)
66. EXISTING ROOM TEMP SENSOR IN ROOM DB06A TO BE REPLACED
67. EXISTING ROOM HUMIDITY SENSOR IN ROOM DB06A TO BE REPLACED
68. EXISTING ROOM TEMP SENSOR IN ROOM DB06A TO BE REPLACED
69. EXISTING ROOM HUMIDITY SENSOR IN ROOM DB06A TO BE REPLACED
70. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACT.
71. EXISTING ROOM EMS TEMP. SENSOR TO BE REPLACED (ROOM D117)
72. EXISTING ROOM EMS HUMIDITY SENSOR TO BE REPLACED (ROOM D117)

GENERAL NOTE:
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Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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KEY PLAN
POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAM - A/C #2 BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No. 637-08-103

Approved By:

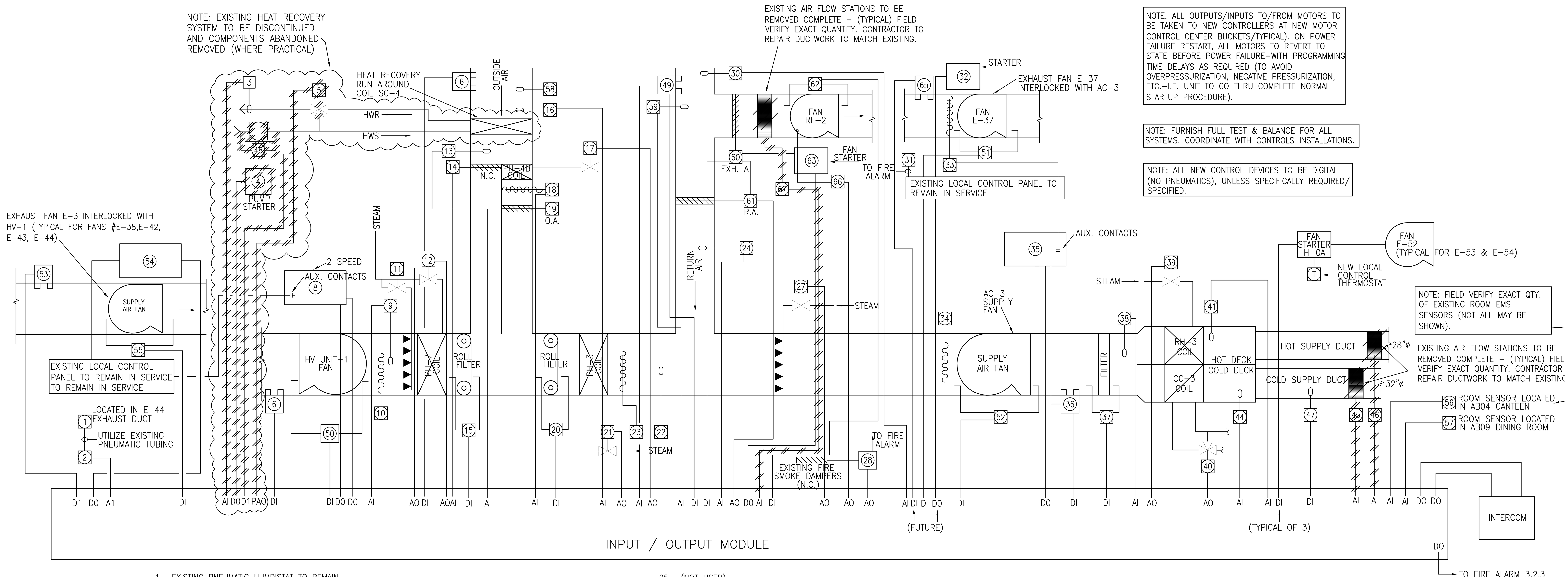
Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M102

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs



1. EXISTING PNEUMATIC HUMDISTAT TO REMAIN.
2. EXISTING PNEUMATIC TO ELECTRIC TRANSDUCER TO REMAIN.
3. EXISTING HEAT RECOVERY WATER LOOP TEMPERATURE SENSOR TO BE REMOVED.
4. EXISTING HEAT RECOVERY COIL PUMP STARTER OUTPUT TO BE REMOVED.
5. EXISTING HEAT RECOVERY 3-WAY BYPASS VALVE OUTPUT TO BE REMOVED.
6. EXISTING DUCT SMOKE DETECTOR TO REMAIN.
7. (NOT USED).
8. EXISTING HV-1 UNIT FAN STARTER TO REMAIN.
9. EXISTING THERMOSTAT TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
10. EXISTING FREEZE DETECTION THERMOSTAT TO BE REPLACED.
11. EXISTING HUMDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
12. EXISTING 2-1/2" N.O. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR
13. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
14. EXISTING PNEUMATIC DAMPER ACTUATOR FOR ECONOMIZER RELIEF DAMPER TO BE REPLACED WITH ELECTRONIC ACTUATOR.
15. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
16. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
17. EXISTING 2" N.O. STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
18. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
19. EXISTING OUTSIDE AIR DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
20. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
21. EXISTING 1" N.O. STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
22. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
23. (NOT USED).
24. NEW TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
25. (NOT USED).
26. (NOT USED).
27. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
28. EXISTING FIRE DAMPER ACTUATOR TO REMAIN IN SERVICE.
29. NOT USED.
30. EXISTING HUMIDITY SENSOR TO BE REPLACED (RETURN DUCT)
31. EXISTING THERMOSTAT TO BE REPLACED.
32. EXISTING EXHAUST FAN STARTER TO REMAIN.
33. EXISTING FIRE DETECTION SENSOR TO REMAIN.
34. EXISTING FREEZE DETECTION SESNOR TO BE REPLACED.
35. EXISTING SUPPLY FAN STARTER TO REMAIN.
36. EXISTING SMOKE DETECTOR TO REMAIN.
37. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
38. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW.
39. EXISTING 1-1/4" N.C. STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
40. EXISTING 4" 3-WAY CHILLED WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
41. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
42. (NOT USED).
43. (NOT USED).
44. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
45. EXISTING AIR STATION TO BE REMOVED.
46. EXISTING AIR STATION TO BE REMOVED.
47. EXISTING HUMIDITY SENSOR TO BE REPLACED.
48. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
49. EXISTING SMOKE DETECTOR TO REMAIN(RETURN AIR DUCT).
50. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
51. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
52. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPALCED.
53. EXISTING SMOKE DETECTOR TO REMAIN (EXHAUST AIR) (TYPICAL OF 5) (FUTURE).
54. EXISTING EXHAUST FAN STARTER TO REMAIN (TYPICAL OF 5).
55. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
56. EXISTING ROOM EMS SENSOR TO BE REPLACED (COORDINATE QUANTITY)– AB04 CANTEEN.
57. EXISTING ROOM EMS SENSOR TO BE REPLACED (COORDINATE QUANTITY)– AB09 DINING ROOM.
58. EXISTING OUTSIDE AIR ENTHALPY SENSOR TO BE REPLACED.
59. EXISTING RETURN AIR ENTHALPY SENSOR TO BE REPLACED.
60. EXISTING RELIEF AIR DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
61. EXISTING RETURN AIR DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
62. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
63. EXISTING FAN STARTER TO REMAIN.
64. EXISTING AIR SMOKE DETECTOR TO REMAIN.
65. FUTURE SMOKE DETECTOR.
66. EXISTING RF-2 INLET VANES PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
67. EXISTING AIR FLOW SENSOR TO BE REMOVED.

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
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11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the govenment.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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KEY PLAN: POWER PLANT; QUAD 'D'; QUAD 'A'; QUAD 'C'; QUAD 'B'; N PROJECT NORTH

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: CONTROL DIAGRAM - A/C #3 BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M103

Dwg. 10 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

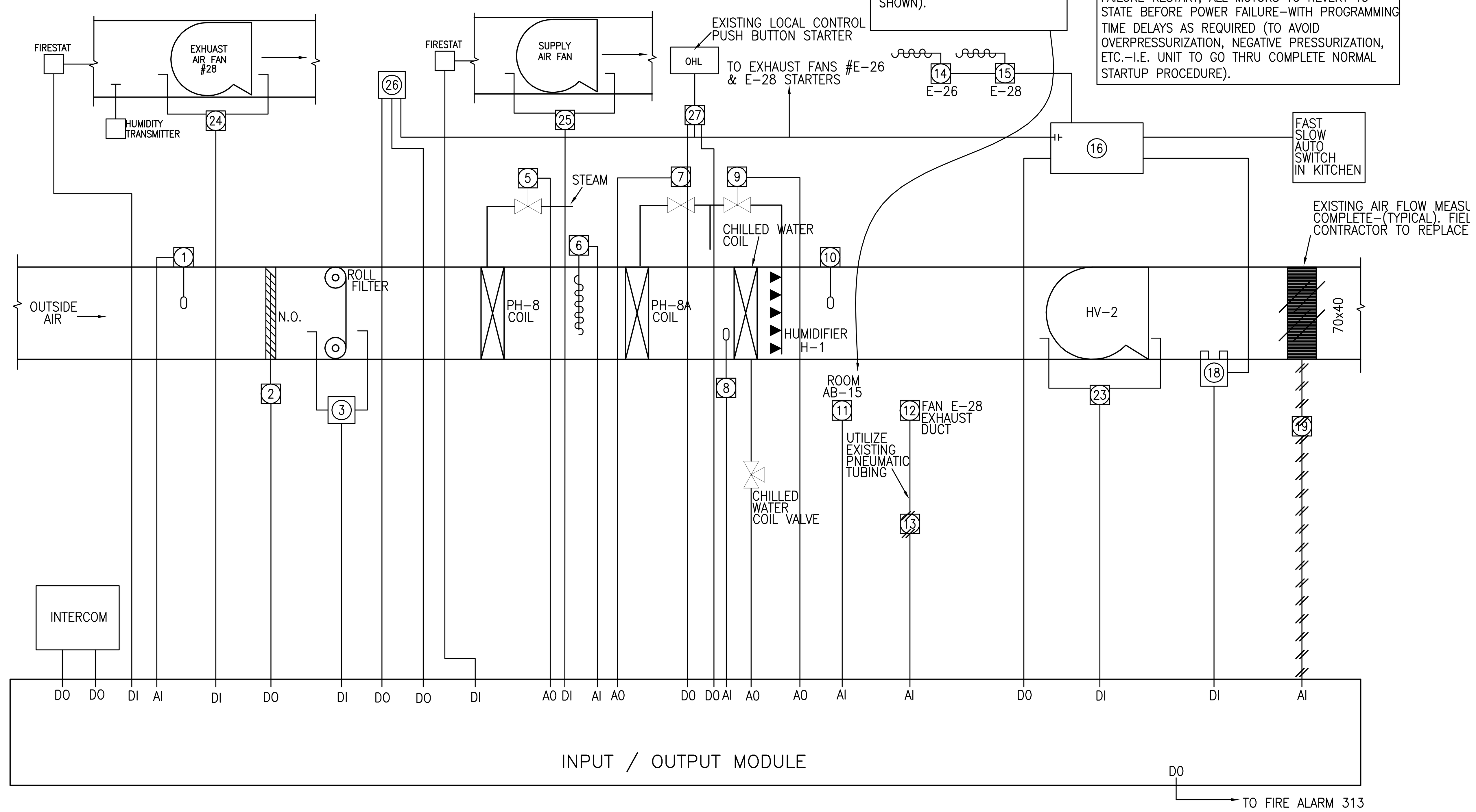
Location: ASHEVILLE, N.C.

Office of Facilities

Department of Veterans Affairs

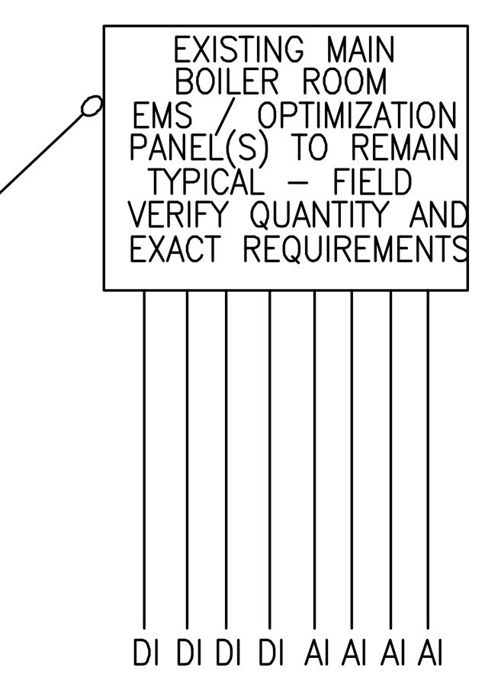
NOTE: FIELD VERIFY EXACT QTY. OF EXISTING ROOM EMS SENSORS (NOT ALL MAY BE SHOWN).

NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE–WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.–I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).



1. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
2. EXISTING OUTSIDE AIR DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
3. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
4. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
5. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
6. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
7. EXISTING STEAM VALVE WITH PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
8. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
9. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
10. (NOT USED).
11. EXISTING ROOM TEMPERATURE SENSOR TO BE REPLACED.
12. EXISTING EXHAUST DUCT HYGROSTAT TO BE REPLACED.
13. PNEUMATIC TO ELECTRIC RELAY TO BE REMOVED.
14. EXISTING FIRE DECTECTION THERMOSTAT AT EXHAUST FAN E-26 TO REMAIN.
15. EXISTING FIRE DECTECTION THERMOSTAT AT EXHAUST FAN E-28 TO REMAIN.
16. EXISTING SUPPLY FAN STARTER TO REMAIN.
17. (NOT USED).
18. EXISTING SMOKE DETECTOR TO REMAIN.
19. EXISTING AIR FLOW SENSOR TO BE REMOVED.
20. (NOT USED).
21. (NOT USED).
22. (NOT USED).
23. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
24. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
25. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
26. EXISTING FAN #E-28 STARTER (2-SPEED) TO REMAIN.
27. EXISTING FAN #E-26 STARTER (2-SPEED) TO REMAIN.

NOTE: EXISTING BOILER ROOM OPTIMAZATION / CONTROL PANELS TO REMAIN IN SERVICE. CONTRACTOR TO CONNECT TO EXISTING PANELS AND PICK-UP ALL MONITORING POINTS AVAILABLE FROM PANEL(S) – FIELD VERIFY EXACT REQUIREMENTS WITH EXISTING PANELS / CONTROLLERS. EMS SYSTEM SHALL (AT THIS TIME) ONLY PROVIDE MONITORING FUNCTION OF EQUIPMENT ALARMS, STATUS, TEMPERATURES, ETC.. CONTROL FUNCTION / SEQUENCE OF OPERATION TO REMAIN VIA EXISTING CONTROLLERS. FURNISH ALL INTERFACE DEVICES, RELAYS, CONDUIT / WIRING, ETC. AS REQUIRED FOR COMPLETE INTERFACE BETWEEN BUILDING EMS AND EXISTING CONTROLLERS. PROVIDE MONITORING OF THE FOLLOWING (IN ADDITION TO OTHER POINTS AS AVAILABLE WITHIN CONTROLLERS / REQUESTED BY THE OWNER): BOILER #1–#3 STATUS, PRESSURE, FUEL FIRING (OIL / GAS), FIRING RATE, AND ALARM; FUEL OIL STOR. TANK #1–#2 LEVEL AND TEMPERATURE; FUEL OIL HEATING AND PUMPING SET STATUS AND ALARM; STEAM MAIN PRESSURE / TEMPERATURE; FEEDWATER PUMP (3 QTY.) STATUS AND ALARM; CONDENSATE PUMP (3 QTY.) STATUS AND ALARM; HOT WATER GENERATOR #1–#2 STATUS AND TEMPERATURE; DOMESTIC HOT WATER TEMPERATURE(S); ETC..

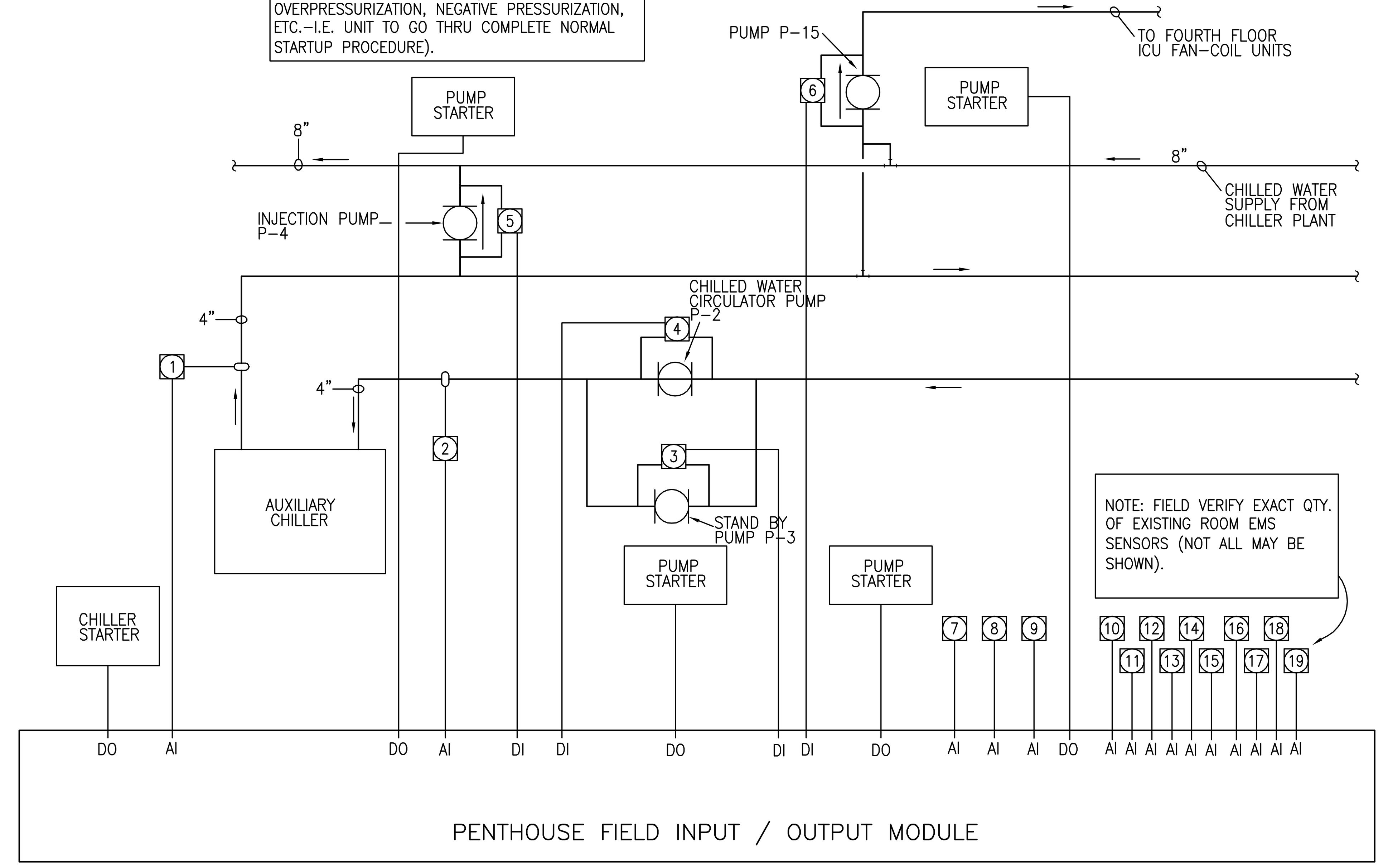


NOTE: FURNISH FULL TEST & BALANCE FOR ALL SYSTEMS. COORDINATE WITH CONTROLS INSTALLATIONS.

NOTE: ALL NEW CONTROL DEVICES TO BE DIGITAL (NO PNEUMATICS), UNLESS SPECIFICALLY REQUIRED/ SPECIFIED.

NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE–WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.–I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...



1. EXISTING CHILLED WATER SUPPLY TEMPERATURE SENSOR TO BE REPLACED.
2. EXISTING CHILLED WATER RETURN TEMPERATURE SENSOR TO BE REPLACED.
3. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
4. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
5. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
6. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
7. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A113 TO BE REPLACED.
8. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A148 TO BE REPLACED.
9. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A232 TO BE REPLACED.
10. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A252 TO BE REPLACED.
11. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A323 TO BE REPLACED.
12. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A352 TO BE REPLACED.
13. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #B319 TO BE REPLACED.
14. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A423 TO BE REPLACED.
15. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A452 TO BE REPLACED.
16. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #B419 TO BE REPLACED.
17. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A523 TO BE REPLACED.
18. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #A552 TO BE REPLACED.
19. EXISTING TEMPERATURE SENSOR IN NURSES STATION ROOM #B519 TO BE REPLACED.

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
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12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007–30

Drawing Title: CONTROL DIAGRAM - H/V #2; O.R. AUX. CHILLER SYSTEM; AND MAIN BOILER ROOM BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03–13–08

Project No. 637–08–103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

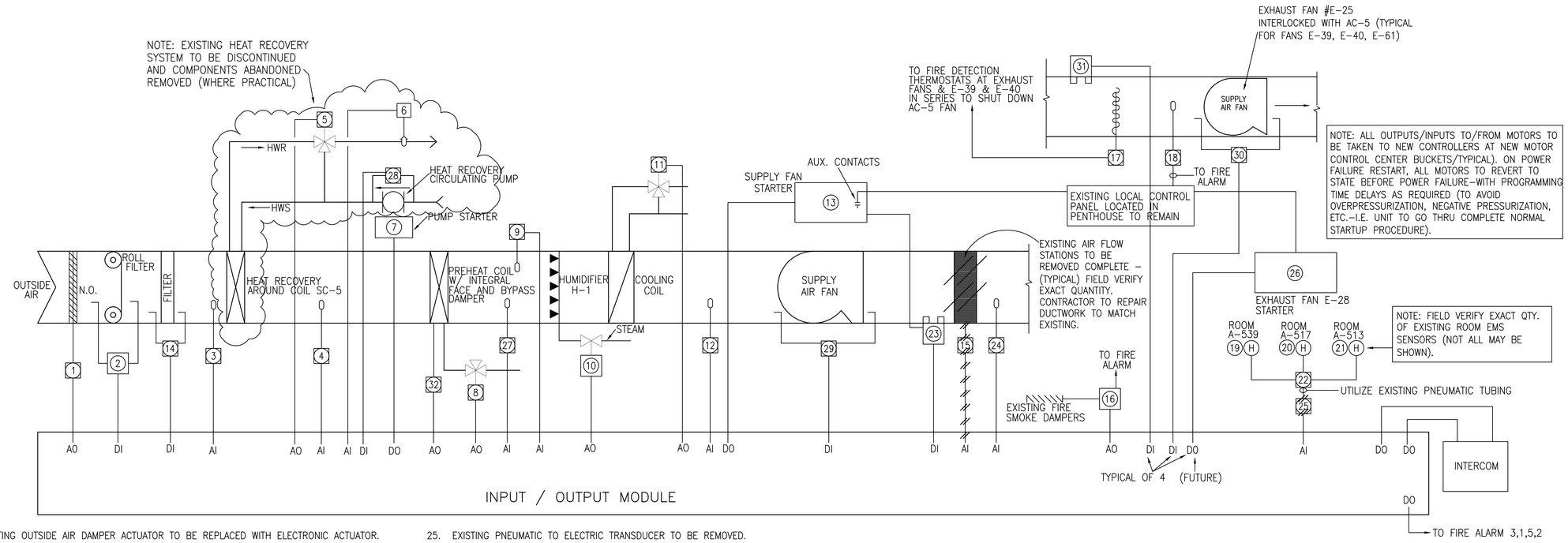
Location: ASHEVILLE, N.C.

DRAWING NO. M104

Dwg. 11 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Office of Facilities
Department of Veterans Affairs



NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE-WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.-I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).

NOTE: FIELD VERIFY EXACT QTY. OF EXISTING ROOM EMS SENSORS (NOT ALL MAY BE SHOWN).

1. EXISTING OUTSIDE AIR DAMPER ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
2. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
3. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW.
4. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW
5. EXISTING HEAT RECOVERY 3-WAY (BY-PASS) VALVE TO BE REMOVED.
6. EXISTING HEAT RECOVERY WATER LOOP TEMPERATURE SENSOR TO BE REMOVED.
7. EXISTING HEAT RECOVERY CIRCULATING PUMP STARTER TO BE REMOVED.
8. EXISTING STEAM VALVE ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
9. EXISTING NEW TEMPERATURE SENSOR TO BE REPLACED.
10. EXISTING STEAM VALVE ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
11. EXISTING 3-WAY CHILLED WATER VALVE ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
12. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
13. EXISTING SUPPLY FAN STARTER TO REMAIN.
14. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
15. EXISTING AIR FLOW SENSOR TO BE REMOVED.
16. EXISTING FIRE DAMPER ACTUATOR TO REMAIN IN SERVICE.
17. EXISTING FIRE DETECTION THERMOSTAT (TYPICAL OF 3) TO REMAIN IN SERVICE.
18. EXISTING THERMOSTAT TO BE REPLACED.
19. EXISTING ROOM HUMIDISTAT TO BE REPLACED.
20. EXISTING ROOM HUMIDISTAT TO BE REPLACED.
21. EXISTING ROOM HUMIDISTAT TO BE REPLACED.
22. EXISTING 3 POINT AVERAGING RELAY TO BE REPLACED.
23. EXISTING SMOKE DETECTOR TO REMAIN.
24. EXISTING HUMIDITY SENSOR TO BE REPLACED.
25. EXISTING PNEUMATIC TO ELECTRIC TRANSDUCER TO BE REMOVED.
26. EXISTING EXHAUST FAN STARTER (TYPICAL OF 3) TO REMAIN IN SERVICE.
27. EXISTING FREEZESTAT TO BE REPLACED.
28. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REMOVED.
29. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
30. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
31. EXISTING SMOKE DETECTOR TO REMAIN (TYPICAL OF 4) (FUTURE).
32. EXISTING BYPASS DAMPER ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.

NOTE: FURNISH FULL TEST & BALANCE FOR ALL SYSTEMS. COORDINATE WITH CONTROLS INSTALLATIONS.

NOTE: ALL NEW CONTROL DEVICES TO BE DIGITAL (NO PNEUMATICS), UNLESS SPECIFICALLY REQUIRED/ SPECIFIED.

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
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BUILDING IS FULLY SPRINKLERED

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

Seal: NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 024539 6-6-08 MARK R. MCDANIEL

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POWER PLANT — QUAD 'D' | QUAD 'A' | QUAD 'C' | QUAD 'B' — N PROJECT NORTH — KEY PLAN

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30		
Drawing Title: CONTROL DIAGRAM - A/C #5 BUILDING 47 - BASE BID	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS		Date: 03-13-08
			Project No.: 637-08-103
Approved By:	Building Number: 47	Checked: MRM / Drawn: WTJ	DRAWING NO.: M105
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.		Dwg. 12 or 29

Office of Facilities — Department of Veterans Affairs

1. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
2. EXISTING OUTSIDE AIR DAMPER ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
3. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
4. EXISTING BYPASS DAMPER ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
5. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
6. EXISTING SPDT ELECTRIC REMOTE BULB THERMOSTAT TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
7. EXISTING FIRE DETECTION THERMOSTAT TO REMAIN IN SERVICE.
8. EXISTING EXHAUST FAN STARTER TO REMAIN IN SERVICE.
9. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
10. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
11. (NOT USED).
12. EXISTING FREEZESTAT TO BE REPLACED.
13. EXISTING 3-WAY CHILLED WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
14. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
15. EXISTING 3-WAY CHILLED WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
16. (NOT USED).
17. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
18. EXISTING PNEUMATIC ROOM HUMIDISTAT TO BE REPLACED WITH ELETRONIC TEMP. AND HUMIDITY SENSOR.
19. EXISTING SUPPLY FAN STARTER TO BE REPLACED.
20. EXISTING HUMIDITY HIGH LIMIT SENSOR TO BE REPLACED.
21. EXISTING SUPPLY AIR SMOKE DETECTOR TO REMAIN.
22. EXISTING FIRE DAMPER PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
23. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
24. (NOT USED).
25. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
26. EXISTING DISCHARGE AIR SMOKE DAMPER ACTUATOR TO REMAIN.
27. EXISTING AIR FLOW SENSOR TO BE REMOVED.
28. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW TEMPERATURE SENSOR.
29. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
30. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
31. EXISTING PNEUMATIC ROOM HUMIDISTAT TO BE REPLACED WITH ELETRONIC TEMP. AND HUMIDITY SENSOR.
32. (NOT USED).
33. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
34. EXISTING ROOM TEMPERATURE SENSOR TO BE REPLACED.
35. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
36. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
37. (NOT USED).
38. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER/RECORDER TO BE REPLACED.
39. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
40. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
41. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
42. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
43. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW.
44. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTROINC ACTUATOR.
45. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
46. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
47. (NOT USED).
48. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER/RECORDER TO BE REPLACED.
49. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
50. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
51. EXISTING TEMPERATURE LOCATED BEHIND EXHAUST REGISTER TO BE REPLACED.
52. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
53. EXISTING TEMPERATURE SENSOR TO BE REPLACED.
54. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
55. EXISTING 3-WAY HOT WATER VAVLE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
56. EXISTING HUMIDIFIER STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
57. (NOT USED).
58. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER/RECORDER TO BE REPLACED.
59. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
60. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
61. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
62. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
63. EXISTING TEMPEATURE SENSOR TO BE REPLACED.
64. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
65. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
66. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
67. (NOT USED).
68. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER/RECORDER TO BE REPLACED.
69. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
70. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
71. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
72. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
73. EXISTING TEMPEATURE SENSOR TO BE REPLACED.
74. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
75. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
76. EXISTING STEAM VALVE PNEUMATIC ACTUATOR TO BE REPALCED WITH ELECTRONIC ACTUATOR.
77. (NOT USED).
78. EXISTING TEMPERATURE AND HUMIDITY CONTROLLER/RECORDER TO BE REPLACED.
79. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
80. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
81. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
82. EXISTING HUMIDITY SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
83. EXISTING TEMPEATURE SENSOR TO BE REPLACED.
84. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACT. TO BE REPLACED WITH ELECTRONIC ACT.
85. EXISTING TEMPERATURE SENSOR BEHIND EXHAUST REGISTER TO BE REPLACED.
86. EXISTING 3-WAY HOT WATER VALVE PNEUMATIC ACT. TO BE REPLACED WITH ELECTRONIC ACT.
87. PNEUMATIC TO ELECTRIC TRANSDUCER TO BE REMOVED.
88. PNEUMATIC TO ELECTRIC TRANSDUCER TO BE REMOVED.
89. (NOT USED).
90. (NOT USED).
91. (NOT USED).
92. (NOT USED).
93. (NOT USED).
94. (NOT USED).
95. (NOT USED).
96. EXISTING SMOKE DETECTOR (EXHAUST DUCT) TO REMAIN.
97. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
98. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
99. EXISTING HEAT RECOVERY WATER LOOP TEMPERATURE SENSOR TO BE REMOVED.
100. NEW HEAT RECOVERY 3-WAY (BY-PASS) VALVE.

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
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13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R. McDOWELL 6-6-08

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N PROJECT NORTH
KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAM - A/C #6 AND O.R. CONTROLS (BUILDING 47)

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M106

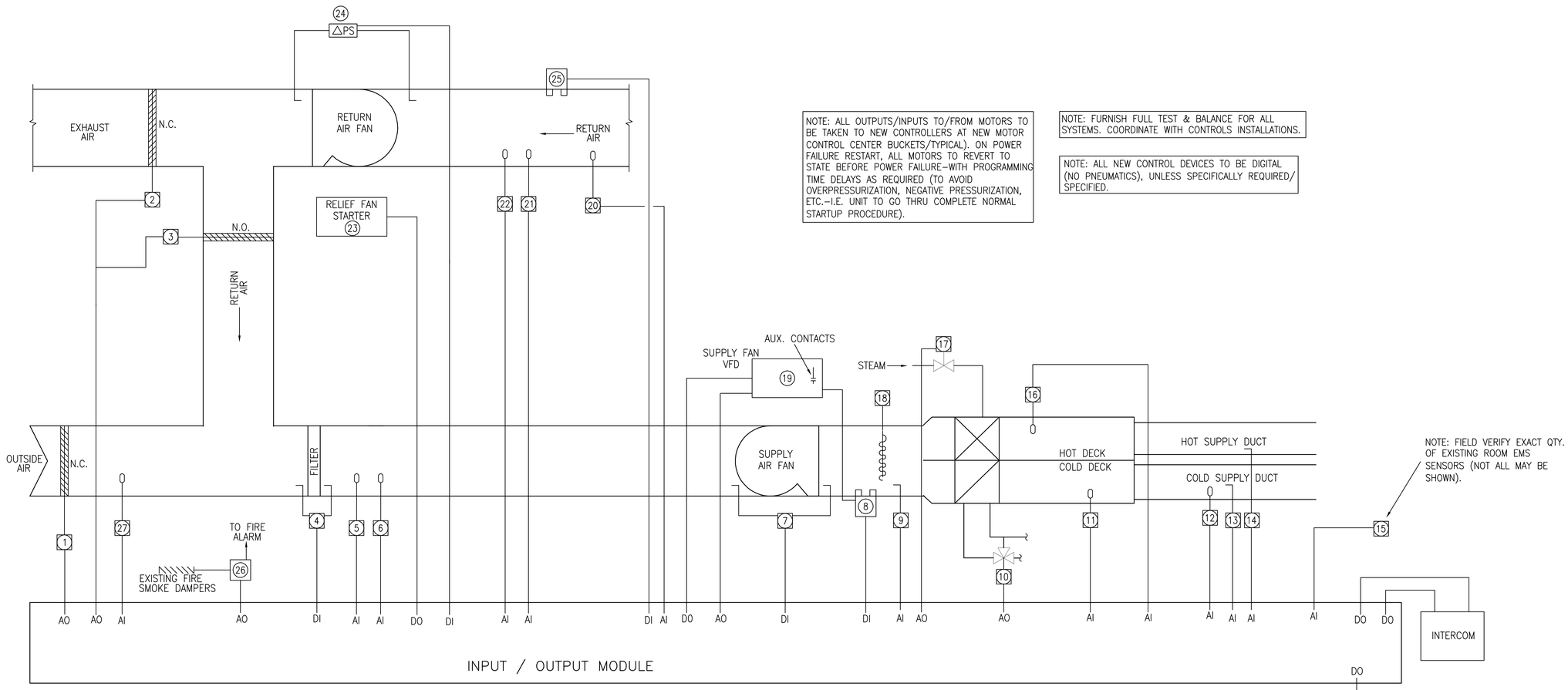
Location: ASHEVILLE, N.C.

Dwg. 13 of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Office of Facilities

Department of Veterans Affairs



NOTE: ALL OUTPUTS/INPUTS TO/FROM MOTORS TO BE TAKEN TO NEW CONTROLLERS AT NEW MOTOR CONTROL CENTER BUCKETS/TYPICAL). ON POWER FAILURE RESTART, ALL MOTORS TO REVERT TO STATE BEFORE POWER FAILURE–WITH PROGRAMMING TIME DELAYS AS REQUIRED (TO AVOID OVERPRESSURIZATION, NEGATIVE PRESSURIZATION, ETC.–I.E. UNIT TO GO THRU COMPLETE NORMAL STARTUP PROCEDURE).

NOTE: FURNISH FULL TEST & BALANCE FOR ALL SYSTEMS. COORDINATE WITH CONTROLS INSTALLATIONS.

NOTE: ALL NEW CONTROL DEVICES TO BE DIGITAL (NO PNEUMATICS), UNLESS SPECIFICALLY REQUIRED/ SPECIFIED.

1. EXISTING OUTSIDE AIR DAMPER ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
2. EXISTING RELIEF DAMPER ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
3. EXISTING RETURN AIR DAMPER ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
4. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
5. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW (MIXED AIR)
6. EXISTING DUCT HUMIDITY SENSOR (MIXED AIR) TO BE REPLACED WITH NEW.
7. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
8. EXISTING SMOKE DETECTOR TO REMAIN.
9. REPLACE EXISTING DUCT STATIC PRESSURE SENSOR.
10. EXISTING 3–WAY CHILLED WATER VALVE ACTUATOR TO BE REPLACED WITH ELECTRONIC ACTUATOR.
11. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW
12. EXISTING DUCT HUMIDITY SENSOR TO BE REPLACED (HIGH LIMIT).
13. REPLACE EXISTING DUCT STATIC PRESSURE SENSOR (FIELD VERIFY EXACT LOCATION).
14. REPLACE EXISTING DUCT STATIC PRESSURE SENSOR (FIELD VERIFY EXACT LOCATION)
15. EXISTING ROOM SENSOR TO BE REPLACED (FIELD VERIFY EXACT QTY. / LOCATION)
16. EXISTING TEMPERATURE SENSOR TO BE REPLACED WITH NEW
17. EXISTING N.C. STEAM VALVE VALVE PNEUMATIC ACTUATOR TO BE REPLACED WITH NEW ELECTRONIC ACTUATOR.
18. EXISTING FREEZE PROTECTION THERMOSTAT TO BE REPLACED WITH NEW.
19. EXISTING SUPPLY FAN VFD TO REMAIN (START / STOP & FAN SPEED VIA EMS).
20. EXISTING HUMIDITY SENSOR TO BE REPLACED.
21. EXISTING DUCT TEMPERATURE SENSOR TO BE REPLACED (R/A).
22. EXISTING DUCT ENTHALPY SENSOR TO BE REPLACED.
23. EXISTING RELIEF FAN STARTER TO REMAIN.
24. EXISTING DIFFERENTIAL PRESSURE SWITCH TO BE REPLACED.
25. EXISTING SMOKE DETECTOR TO REMAIN.
26. EXISTING FIRE DAMPER ACTUATORS TO REMAIN IN SERVICE (FURNISH E/P RELAYS AS REQUIRED).
27. EXISTING DUCT TEMPERATURE SENSOR TO BE REPLACED (O/A).

NOTE: FURNISH NEW CONTROL DEVICES, CONTROLLERS, CONTROL WIRING/ CONDUIT, REPROGRAMMING, ETC...

GENERAL NOTE:
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2. Schedule on site inspections with the project COTR.
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13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

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KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007–30

Drawing Title: CONTROL DIAGRAM - A/C #7 BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03–13–08

Project No.: 637–08–103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

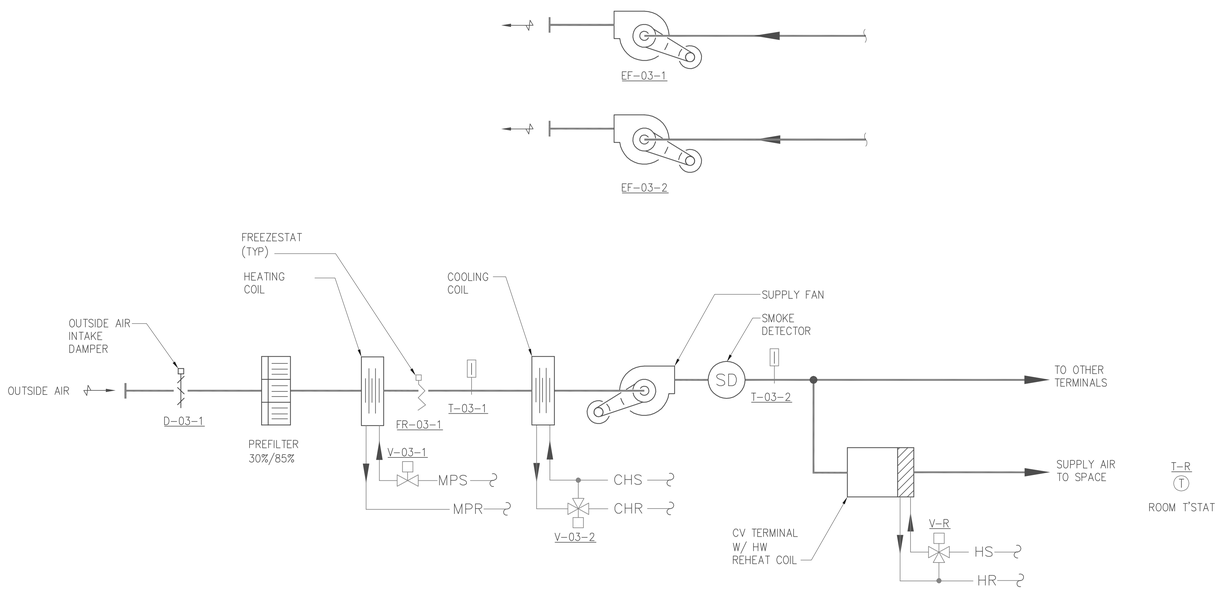
DRAWING NO.: M107

Dwg. 14 of 29

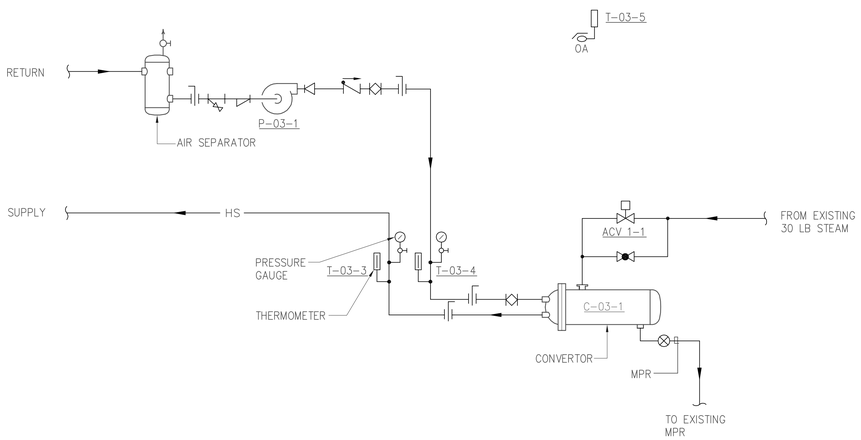
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities — Department of Veterans Affairs



EXISTING A/C #8 CONTROL DIAGRAM



EXISTING STEAM TO HOT WATER CONVERTOR CONTROL DIAGRAM

COORDINATE EXACT LOCATION FOR EQUIPMENT

NOTE: EXISTING CONTROL DEVICES TO REMAIN, UNLESS PNEUMATIC. REPLACE ALL PNEUMATIC OPERATORS, ACTUATORS, AND CONTROL DEVICES WITH ELECTRONIC. EXISTING CONTROL WIRING, PROGRAMMING, ETC. TO REMAIN WHERE PRACTICAL / POSSIBLE.

EXISTING INPUT/OUTPUT SUMMARY

CODE:
A – ANALOG
B – BINARY
X – FUNCTION REQUIRED
* – REFER TO NOTES BELOW

SYSTEM	POINT DESCRIPTION	CONTROL – OUTPUT: DEVICE: MOTOR	VALVE	DAMPER	VAR FREQ DRIVE	CONTROL – OUTPUT: VARIABLE: TEMPERATURE	HUMIDITY	PRESSURE	FLOW	LEVEL	INDICATION – INPUT: TEMPERATURE	HUMIDITY	PRESSURE	STATIC PRESSURE	DIFF PRESSURE	FLOW	CONTACT	KILOWATT	AMPERES	KVA AND KVAR	POWER FACTOR	SOFTWARE FUNCTION: STATUS	ALARM	START-STOP	LEAD-LAG	PROGRAM: S/S OPTIMIZATION	TREND	TOTALIZATION	ENERGY UNITS	SYSTEM GRAPHIC	REMARKS
A/C #8	SUPPLY FAN	B																				X	X	X						X	
	EF-03-1	B																				X	X	X							
	EF-03-2	B																				X	X	X							
	DAMPER D-03-1			A																		X									
	VALVE V-03-1		A																			X									
	VALVE V-03-2		A																			X									
	FREEZESTAT FR-03-1					A																X	X								
	TEMP SENSOR T-03-1					A					A												X								
	TEMP SENSOR T-03-2					A					A												X								
	TEMP SENSOR T-R					A					A																				
	VALVE V-R		A																			X									
C-03-1	PUMP P-03-1	B																				X	X	X						X	
	TEMP SENSOR T-03-3					A					A												X								
	TEMP SENSOR T-03-4					A					A												X								
	TEMP SENSOR T-03-5					A					A																				
	VALVE ACV-1-1		A																			X									

NOTES:

EXISTING SEQUENCE OF OPERATION

The CCMS shall determine the "Occupied and Unoccupied" modes of operation on a pre-determined schedule.

"Occupied Mode" – The Air Handling unit AC-8 shall start and the outside air damper D-03-1 shall open. Exhaust fans EF-03-1, EF-03-2 and the existing ETO Sterilizer exhaust fan, shall start subject to the fire alarm system and the freezestat FR-03-1. Discharge air temperature shall be maintained at 53 degrees F (adjustable) by discharge air temperature transmitter T-03-1 which shall modulate the NO steam valve V-03-1 on the preheat coil and the cooling coil valve V-03-1 in sequence.
Space temperature shall be maintained by space temperature transmitters T-R which shall modulate the 3-way hot water valves V-R on the constant volume reheat boxes.

When Air Handling unit AC-8 is operating, Hot Water Pump P-03-1 shall start and energize the controls for the hot water convertor C-03-1.
Hot water supply temperature shall be reset inversely as the outside air temperature by transmitters T-03-3 and T-03-5. Temperature transmitter T-03-3 shall modulate the steam valve ACV-1-1 on the hot water convertor C-03-1.

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Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 6-6-05 ENGINEER MARK R. McDONELL

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KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAM - A/C #8 BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO.: M108

Dwg. 13 of 29

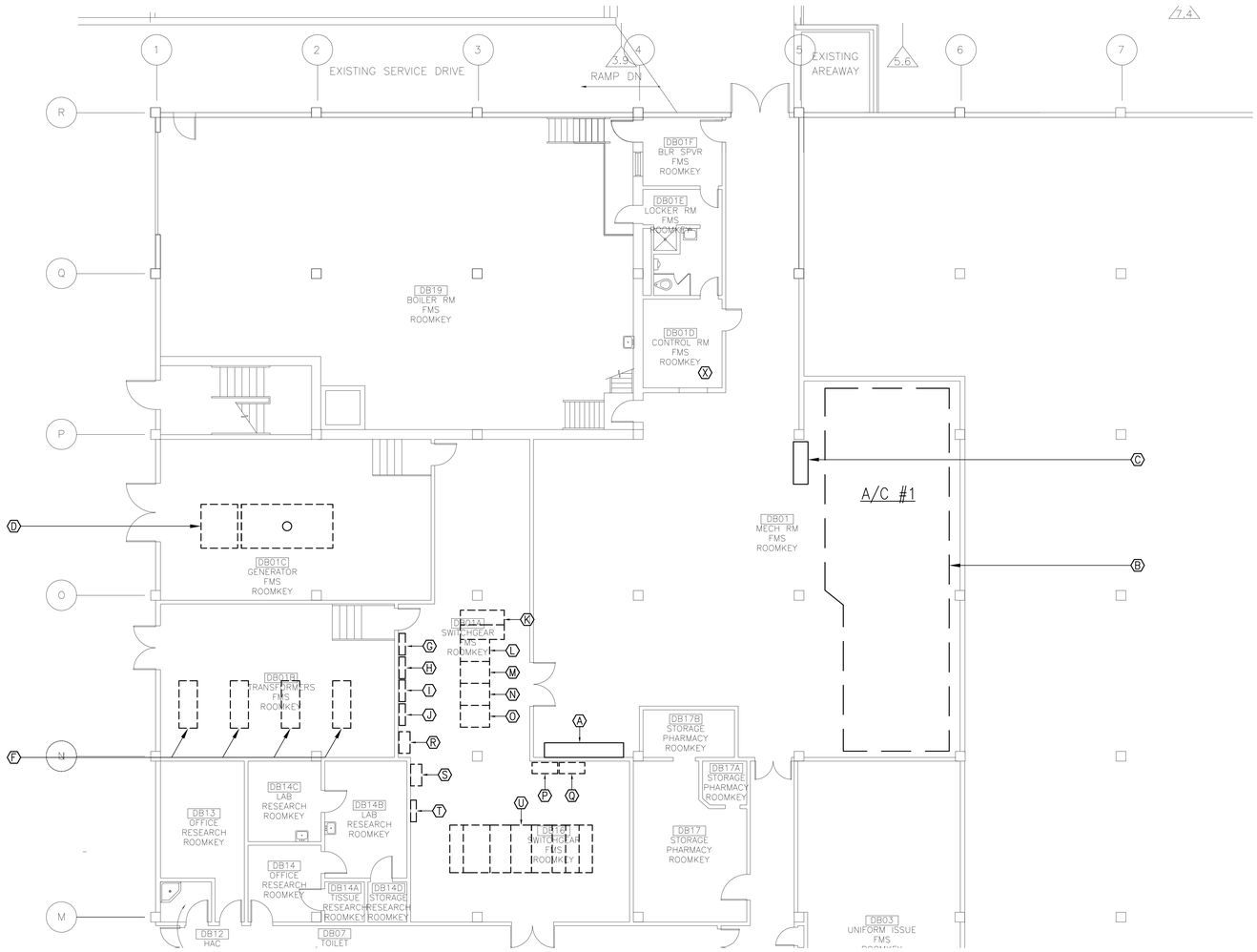
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

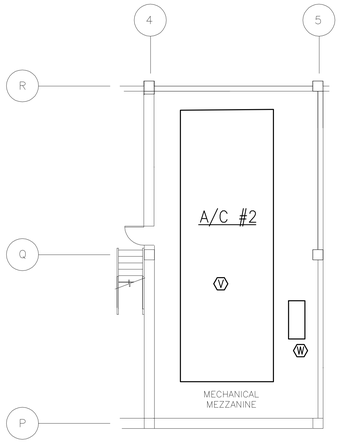
Office of Facilities — Department of Veterans Affairs

KEYED NOTES

- (A) EXISTING MOTOR CONTROL CENTER "MCC-AN"
- (B) EXISTING "AC-1"
- (C) EXISTING MOTOR CONTROL CENTER "MCC-AE"
- (D) EXISTING 1000kW GENERATOR
- (E) (NOT USED)
- (F) EXISTING 1000kVA TRANSFORMER STATIONS, 12,470V/480-277V
- (G) EXISTING PANEL "EQ1" 800A MLO, 277/480V, EQUIPMENT BRANCH
- (H) EXISTING PANEL "EQ2" 800A MLO, 277/480V, EQUIPMENT BRANCH
- (I) EXISTING PANEL "C1" 800A MLO, 277/480V, CRITICAL BRANCH
- (J) EXISTING PANEL "LS1" 400A MLO, 277/480V, LIFE SAFETY BRANCH
- (K) EXISTING "GS1"
- (L) EXISTING ATS EQ1
- (M) EXISTING ATS EQ2
- (N) EXISTING ATS C1
- (O) EXISTING ATS LS1
- (P) EXISTING DISTRIBUTION PANEL "DS1"
- (Q) EXISTING DISTRIBUTION PANEL "DS2"
- (R) EXISTING MAIN SERVICE GROUNDING TERMINAL BOX
- (S) EXISTING TRANSFORMER "TSCL"
- (T) EXISTING PANEL "SCL"
- (U) EXISTING 480V SWITCHGEAR "DBOA1"
- (V) EXISTING "AC-2"
- (W) EXISTING STEAM TO HOT WATER CONVERTOR #3
- (X) EXISTING EMS SYSTEM OPERATOR WORKSTATION



LARGE SCALE BASEMENT MECHANICAL PLAN
1/8" = 1'-0"



LARGE SCALE BASEMENT MECHANICAL MEZZANINE PLAN
1/4" = 1'-0"

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Revisions	Date

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BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: LARGE SCALE BASEMENT MECHANICAL ROOM & MEZZANINE PLANS BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO.: M109

Dwg. 16 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

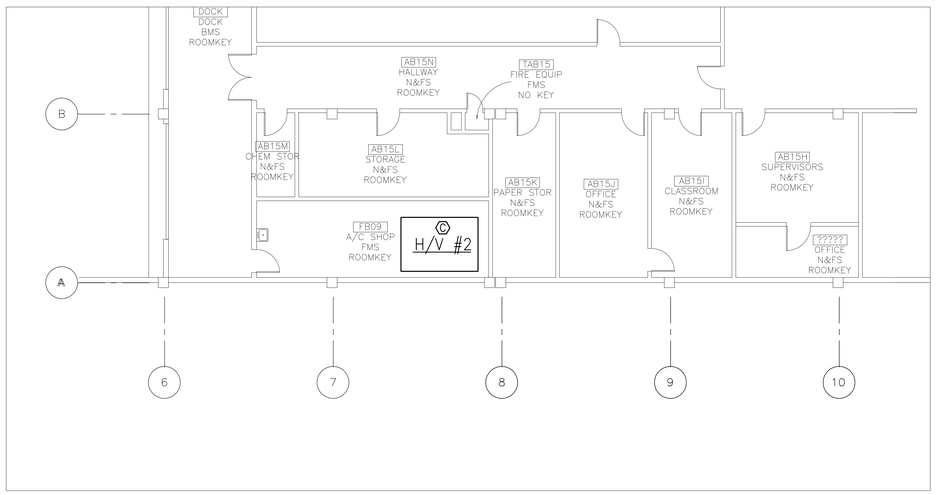
Location: ASHEVILLE, N.C.

Office of Facilities

Department of Veterans Affairs

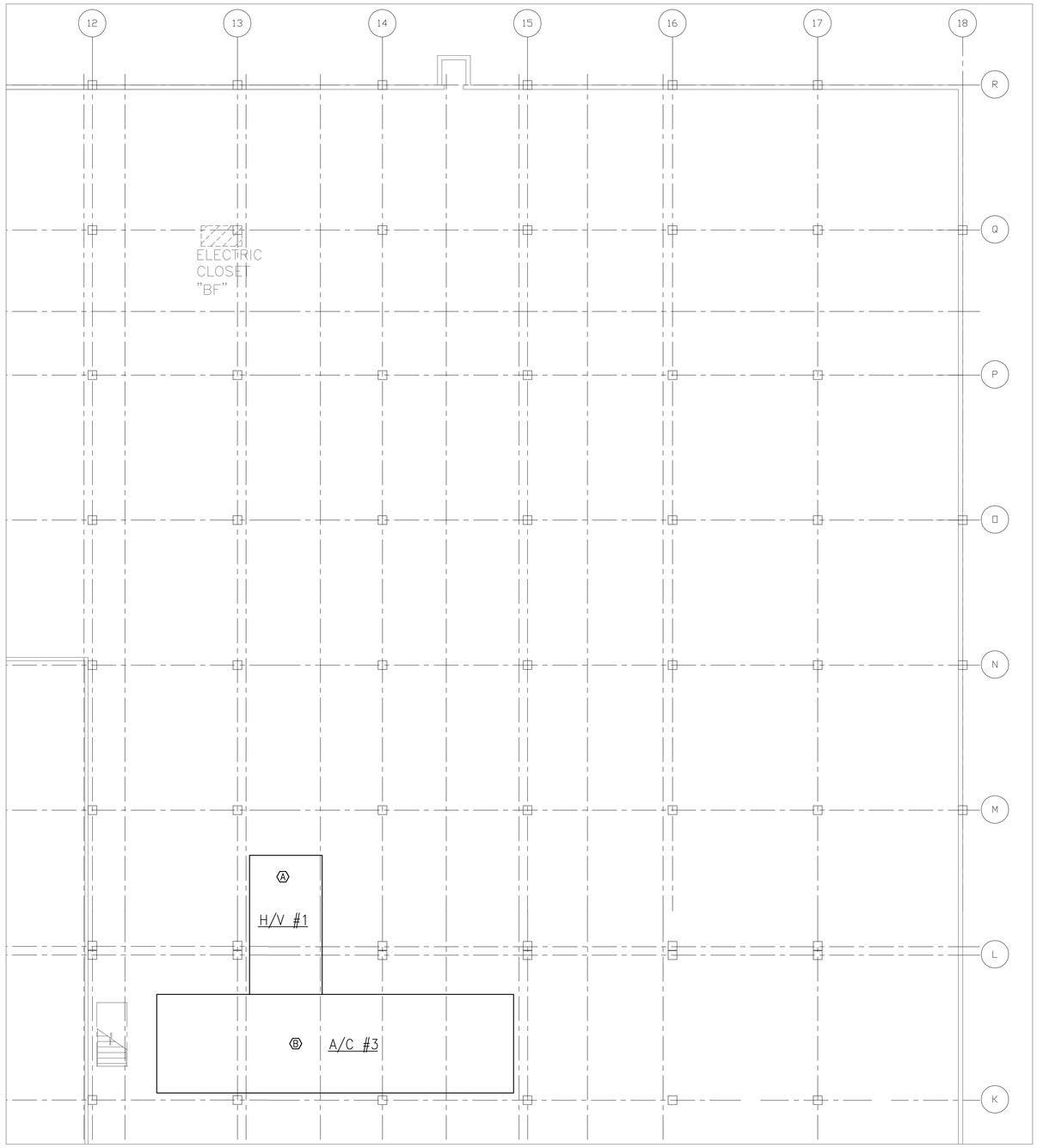
KEYED NOTES

Ⓐ EXISTING "H/V-1"
Ⓑ EXISTING "AC-3"
Ⓒ EXISTING "H/V-2"



BASEMENT MECHANICAL PLAN

1/8" = 1'



CRAWL SPACE MECHANICAL PLAN

1/8" = 1'

GENERAL NOTE:
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2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
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13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

Seal: NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 024539 6-6-08 ENGINEER MARK R. MCDOWELL

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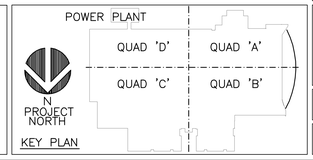
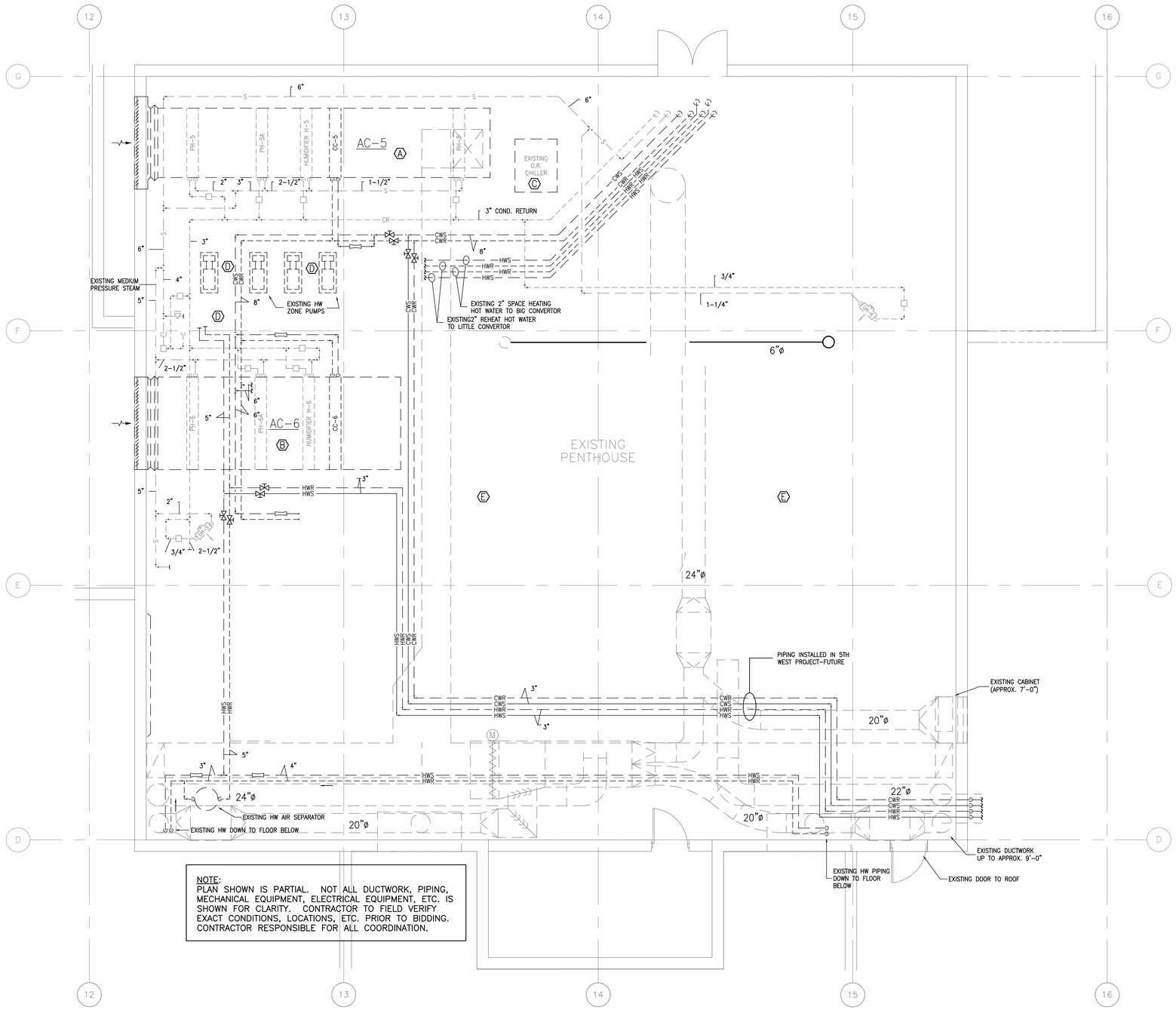


KEY PLAN

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30	
Drawing Title: BASEMENT AND CRAWL SPACE MECHANICAL PLANS BUILDING 47 - BASE BID	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS	Date: 03-13-08
		Project No.: 637-08-103
Approved By:	Building Number: 47 / Checked: MRM / Drawn: WTJ	DRAWING NO.: M110
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.	Dwg. 17 Of 29

Office of Facilities
Department of Veterans Affairs



NOTE:
PLAN SHOWN IS PARTIAL. NOT ALL DUCTWORK, PIPING, MECHANICAL EQUIPMENT, ELECTRICAL EQUIPMENT, ETC. IS SHOWN FOR CLARITY. CONTRACTOR TO FIELD VERIFY EXACT CONDITIONS, LOCATIONS, ETC. PRIOR TO BIDDING. CONTRACTOR RESPONSIBLE FOR ALL COORDINATION.

KEYED NOTES

- (A) EXISTING "AC-5"
- (B) EXISTING "AC-6"
- (C) EXISTING O.R. SUPPLEMENTAL CHILLER
- (D) EXISTING CONVECTORS #1, #2, AND H.W. MAIN / STANDBY PUMPS (NOT IN CONTRACT)
- (E) NEW "AC-4" ON ROOF ABOVE (PART OF HVAC PHASE II PROJECT – NOT IN CONTRACT).

LARGE SCALE PENTHOUSE MECHANICAL PLAN

1/4" = 1'-0"

GENERAL NOTE:
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CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30
Drawing Title: LARGE SCALE PENTHOUSE MECHANICAL PLAN BUILDING 47 - BASE BID	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS
Approved By:	Building Number: 47 / Checked: MRM / Drawn: WTJ
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.
Date: 03-13-08	Project No.: 637-08-103
DRAWING NO.: M111	Dwg. 18 of 29

Revisions | Date

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R. McDOWELL 4-6-08

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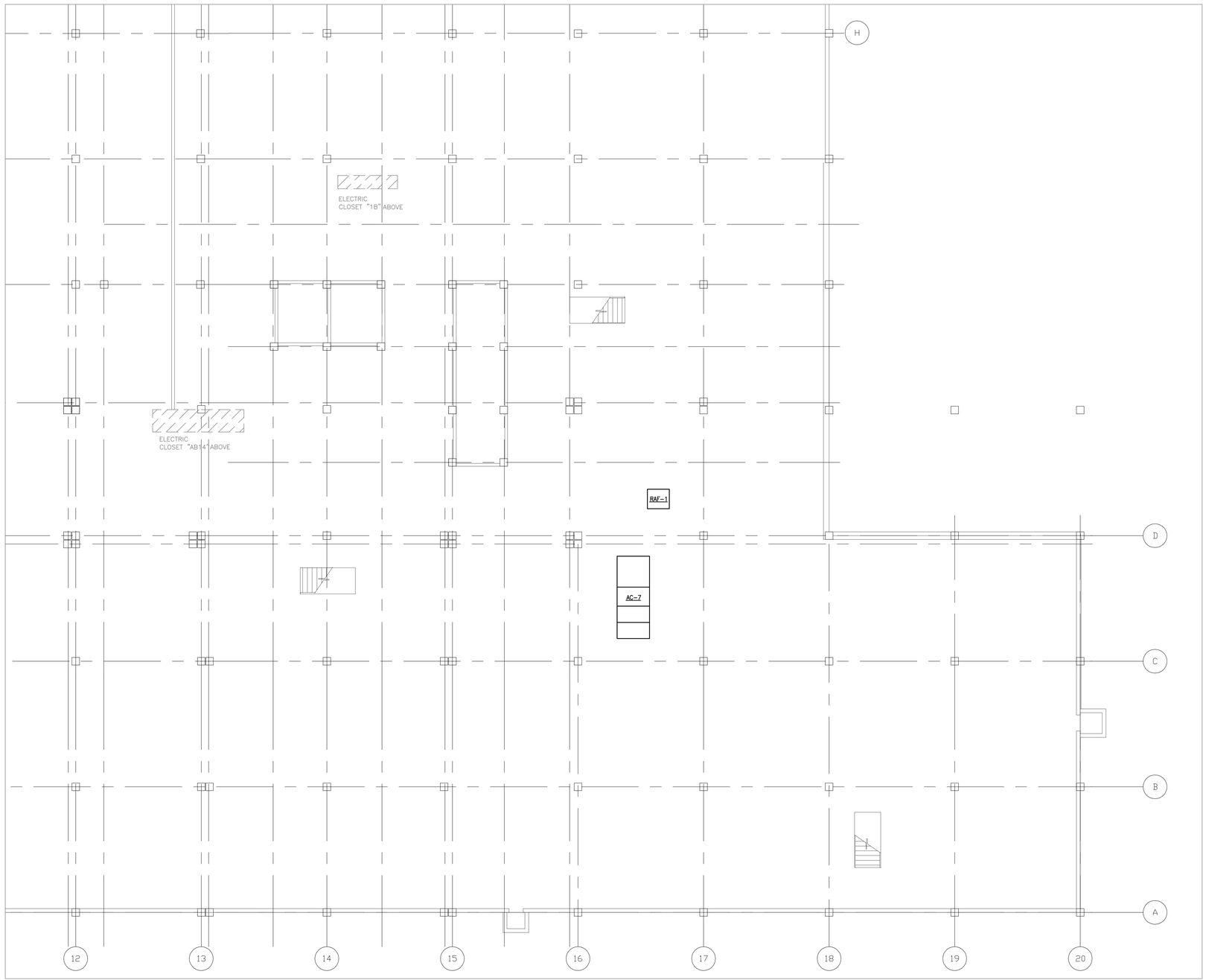
POWER PLANT
QUAD 'D' | QUAD 'A'
QUAD 'C' | QUAD 'B'
N PROJECT NORTH
KEY PLAN

Office of Facilities — Department of Veterans Affairs



CRAWL SPACE MECHANICAL PLAN

1/8" = 1'-0"

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Revisions	Date

Seal:

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POWER PLANT

QUAD 'D' | QUAD 'A'

QUAD 'C' | QUAD 'B'

N PROJECT NORTH

KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: BASEMENT AND CRAWL SPACE MECHANICAL PLANS BUILDING 47 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M112

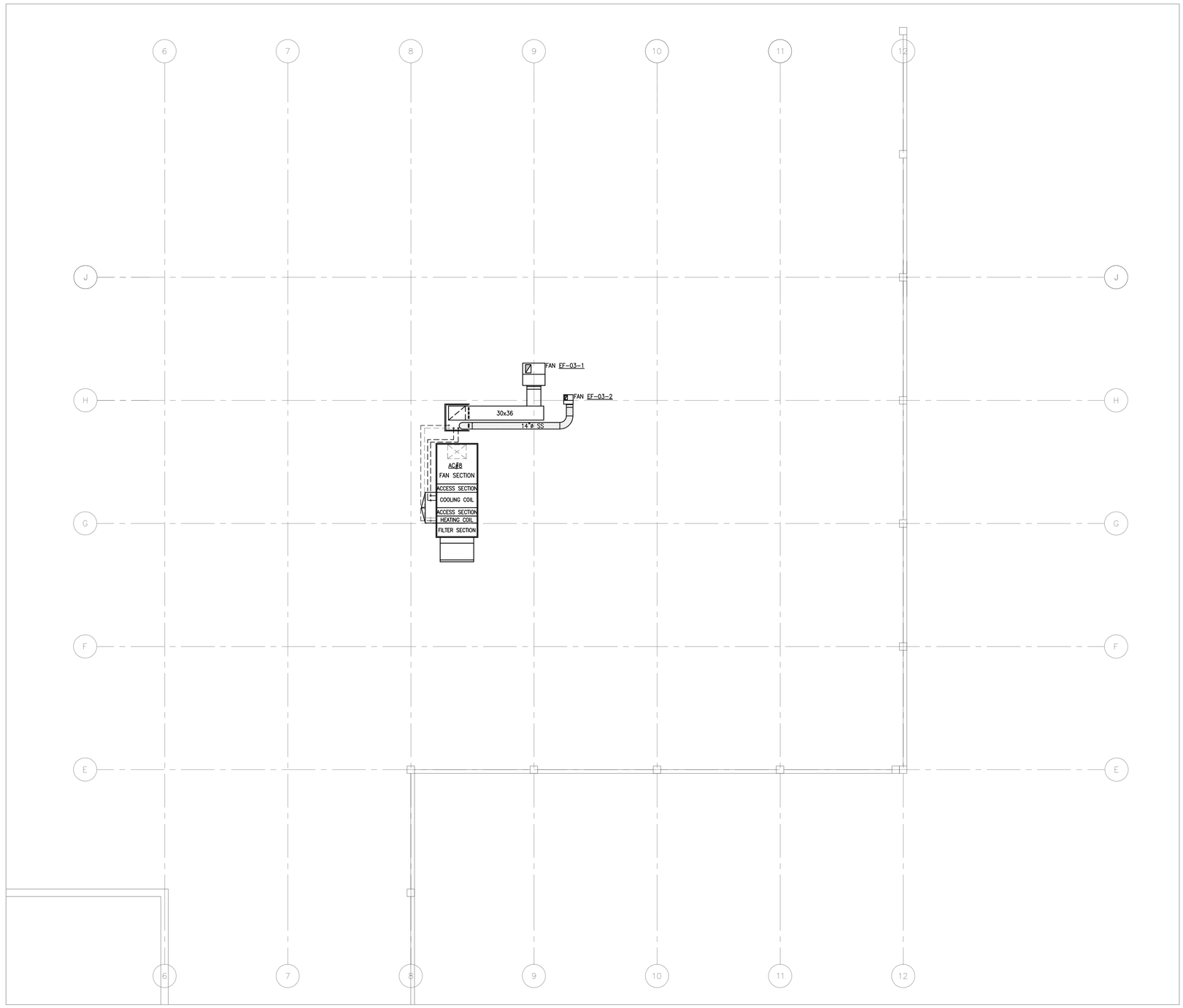
Dwg. 19 Of 29

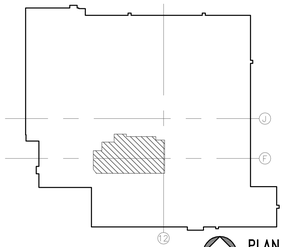
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities

Department of Veterans Affairs





KEY PLAN

ROOF MECHANICAL PLAN

1/8" = 1'-0"

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BUILDING IS FULLY SPRINKLERED

Revisions	Date

Seal:

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT SEAL 024539 6-6-08 ENGINEERING MARK R. McDONELL

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POWER PLANT

QUAD 'D'	QUAD 'A'
QUAD 'C'	QUAD 'B'

N PROJECT NORTH

KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: ROOF MECHANICAL PLAN BUILDING 47 (BASE BID)

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO.: M113

Dwg. 20 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

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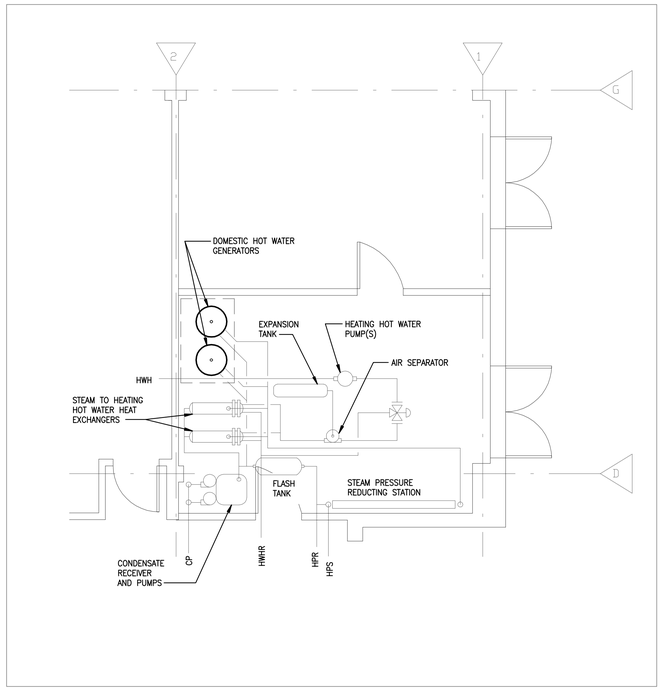
Office of Facilities

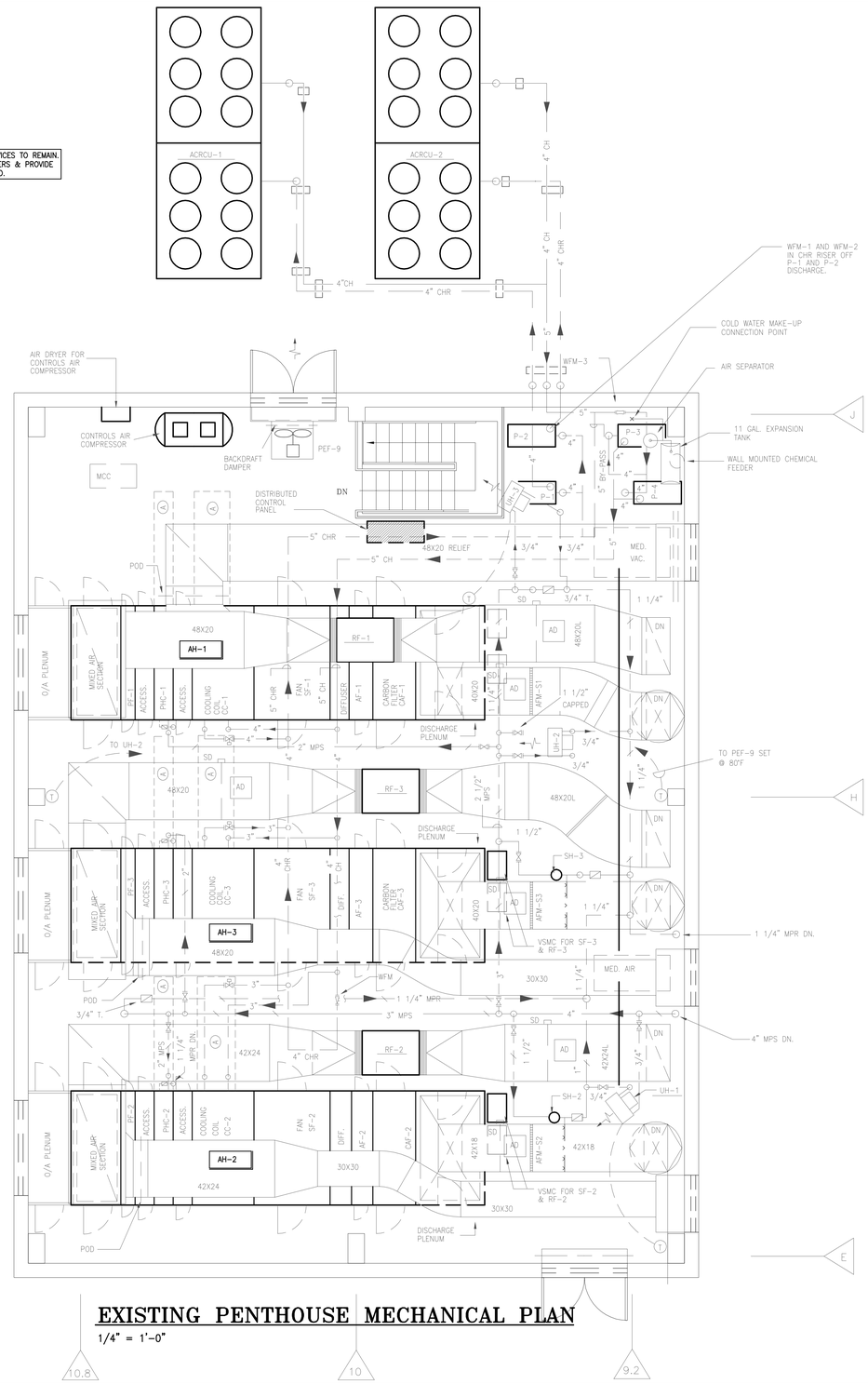
Department of Veterans Affairs



FIRST FLOOR AREA A MECHANICAL ROOM PLAN

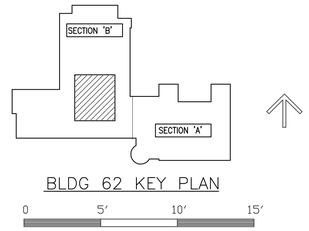
1/4" = 1'-0"

NOTE: EXISTING CONTROL DEVICES TO REMAIN. REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.



EXISTING PENTHOUSE MECHANICAL PLAN

1/4" = 1'-0"



BLDG 62 KEY PLAN

0 5' 10' 15'

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POWER PLANT

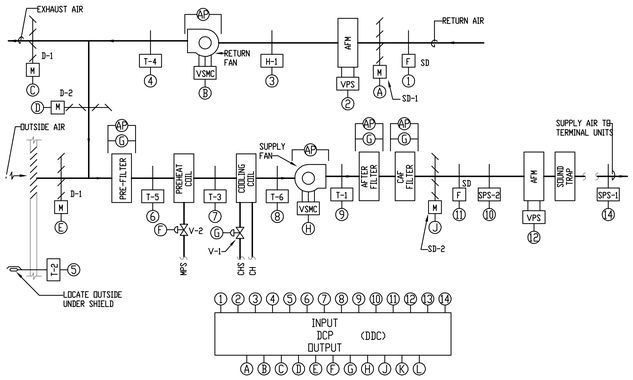
QUAD 'D'	QUAD 'A'
QUAD 'C'	QUAD 'B'

N PROJECT NORTH

KEY PLAN

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30	
Drawing Title: EXISTING MECHANICAL PLANS BUILDING 62 - BASE BID	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS	Date: 03-13-08
		Project No.: 637-08-103
Approved By:	Building Number: 47 / Checked: MRM / Drawn: WTJ	DRAWING NO.: M114
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.	Dwg. 21 Of 29

Office of Facilities — Department of Veterans Affairs



AH-1

SEQUENCE OF OPERATION

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" SHALL BE USED ONLY FOR MAINTENANCE. WHEN UNIT IS "OFF" D-1, D-3, SD-1 AND SD-2 SHALL BE FULLY CLOSED. WHEN UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

2.1 THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, SHALL BE MAINTAINED AT SETPOINT BY DCP MODULATING V-1 OR D-2 AND D-3 OR V-2 IN SEQUENCE.

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS ABOVE 65°F, THE DCP SHALL PREVENT THE MODULATION OF D-2 AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-2 FULLY OPENED AND D-3 FULLY CLOSED). THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BETWEEN 65°F AND THE SUPPLY AIR TEMPERATURE T-1, DAMPER D-2 SHALL BE FULLY CLOSED AND D-3 SHALL BE FULLY OPENED (MAXIMUM OUTSIDE AIR POSITION). THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, THEN DAMPERS D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR IN THIS MODE THEN V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE.

3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DCP MODULATING SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER (VSMC) TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT (SET AT 1.00 INCHES STATIC PRESSURE) AS SENSED BY SPS-1 (SEE PLANS FOR LOCATION).

3.2 THE DCP USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS SHALL RESET THE RETURN FAN VSMC TO MAINTAIN A CONSTANT CFM DIFFERENCE BETWEEN THE CFM FOR THE SUPPLY FAN AND THE CFM FOR THE RETURN FAN.

3.3 THE DCP USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER THREE INCHES OF STATIC PRESSURE. IF STATIC PRESSURE AT SPS-2 EXCEEDS THREE INCHES SUPPLY FAN SHALL SHUT "OFF".

4. HUMIDITY CONTROL (AH-2 AND AH-3 ONLY)

5. FREEZE PROTECTION

5.1 IF THE AIR TEMPERATURE AS SENSED BY T-3 FALLS BELOW 45°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F, THE UNIT SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND A CRITICAL ALARM SHALL BE INDICATED AT THE DCP AND ECC. FREEZESTATS MUST REMAIN ACTIVE UNDER ALL OPERATING CONDITIONS INDEPENDENT OF OTHER CONTROLS FOR FAN SHUT DOWN.

6. AUTOMATIC SHUTDOWN/RESTART

6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTORS [F] SD SHOWN ABOVE, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE. EXHAUST FANS SERVING SPACE OF SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION

7.1 ON ALL VSMC FANS IN VAV SYSTEMS UPON FAILURE OF THE VSMC THE FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DCP OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT DESIGN SPEED.

SEQUENCE OF OPERATION

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" SHALL BE USED ONLY FOR MAINTENANCE. WHEN UNIT IS "OFF" D-1, D-3, SD-1 AND SD-2 SHALL BE FULLY CLOSED. WHEN UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

2.1 THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, SHALL BE MAINTAINED AT SETPOINT BY DCP MODULATING V-1 OR D-2 AND D-3 OR V-2 IN SEQUENCE.

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS ABOVE 65°F, THE DCP SHALL PREVENT THE MODULATION OF D-2 AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-2 FULLY OPENED AND D-3 FULLY CLOSED. THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BETWEEN 65°F AND THE SUPPLY AIR TEMPERATURE T-1, DAMPER D-2 SHALL BE FULLY CLOSED AND D-3 SHALL BE FULLY OPENED (MAXIMUM OUTSIDE AIR POSITION). THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, THEN DAMPERS D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR IN THIS MODE THEN V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE.

3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DCP MODULATING SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER (VSMC) TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT (SET AT 1.00 INCHES STATIC PRESSURE) AS SENSED BY SPS-1 (SEE PLANS FOR LOCATION).

3.2 THE DCP USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS SHALL RESET THE RETURN FAN VSMC TO MAINTAIN A CONSTANT CFM DIFFERENCE BETWEEN THE CFM FOR THE SUPPLY FAN AND THE CFM FOR THE RETURN FAN.

3.3 THE DCP USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER THREE INCHES OF STATIC PRESSURE. IF STATIC PRESSURE AT SPS-2 EXCEEDS THREE INCHES SUPPLY FAN SHALL SHUT "OFF".

4. HUMIDITY CONTROL (AH-2 AND AH-3 ONLY)

4.1 WHEN THE DCP IN NOT CALLING FOR HUMIDITY, SENSED BY H-1, ON-OFF TWO WAY CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DCP IS CALLING FOR HUMIDITY V-3 SHALL REMAIN OPEN.

4.2 THE RETURN AIR HUMIDITY, SENSED BY H-1, SHALL BE MAINTAINED AT SETPOINT BY DCP MODULATING HUMIDITY CONTROL VALVE V-4 TO MAINTAIN THE DESIRED RELATIVE HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN A MAXIMUM HUMIDITY OF 80% AS SENSED BY H-2. DCP SHALL CLOSE VALVE V-3 WHENEVER SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH TEMPERATURE SWITCH TO KEEP HUMIDIFIER OFF UNTIL CONDENSATE APPROACHES STEAM TEMPERATURE.

5. FREEZE PROTECTION

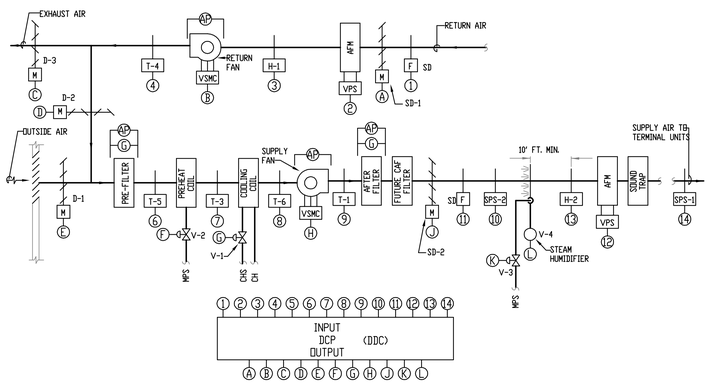
5.1 IF THE AIR TEMPERATURE AS SENSED BY T-3 FALLS BELOW 45°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F, THE UNIT SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND A CRITICAL ALARM SHALL BE INDICATED AT THE DCP AND ECC. FREEZESTATS MUST REMAIN ACTIVE UNDER ALL OPERATING CONDITIONS INDEPENDENT OF OTHER CONTROLS FOR FAN SHUT DOWN.

6. AUTOMATIC SHUTDOWN/RESTART

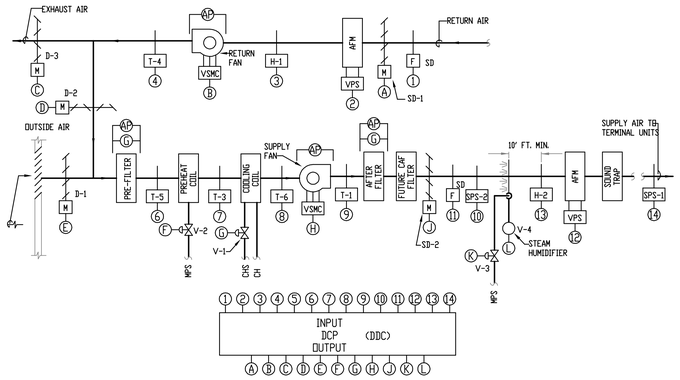
6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTORS [F] SD SHOWN ABOVE, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE. EXHAUST FANS SERVING SPACE OF SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION

7.1 ON ALL VSMC FANS IN VAV SYSTEMS UPON FAILURE OF THE VSMC THE FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DCP OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT DESIGN SPEED.



AH-2



AH-3

SEQUENCE OF OPERATION

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" SHALL BE USED ONLY FOR MAINTENANCE. WHEN UNIT IS "OFF" D-1, D-3, SD-1 AND SD-2 SHALL BE FULLY CLOSED. WHEN UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

2.1 THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, SHALL BE MAINTAINED AT SETPOINT BY DCP MODULATING V-1 OR D-2 AND D-3 OR V-2 IN SEQUENCE.

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS ABOVE 65°F, THE DCP SHALL PREVENT THE MODULATION OF D-2 AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-2 FULLY OPENED AND D-3 FULLY CLOSED. THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BETWEEN 65°F AND THE SUPPLY AIR TEMPERATURE T-1, DAMPER D-2 SHALL BE FULLY CLOSED AND D-3 SHALL BE FULLY OPENED (MAXIMUM OUTSIDE AIR POSITION). THE DCP SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY T-1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY T-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY T-1, THEN DAMPERS D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR IN THIS MODE THEN V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE.

3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DCP MODULATING SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER (VSMC) TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT (SET AT 1.00 INCHES STATIC PRESSURE) AS SENSED BY SPS-1 (SEE PLANS FOR LOCATION).

3.2 THE DCP USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS SHALL RESET THE RETURN FAN VSMC TO MAINTAIN A CONSTANT CFM DIFFERENCE BETWEEN THE CFM FOR THE SUPPLY FAN AND THE CFM FOR THE RETURN FAN.

3.3 THE DCP USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER THREE INCHES OF STATIC PRESSURE. IF STATIC PRESSURE AT SPS-2 EXCEEDS THREE INCHES SUPPLY FAN SHALL SHUT "OFF".

4. HUMIDITY CONTROL (AH-2 AND AH-3 ONLY)

4.1 WHEN THE DCP IN NOT CALLING FOR HUMIDITY, SENSED BY H-1, ON-OFF TWO WAY CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DCP IS CALLING FOR HUMIDITY V-3 SHALL REMAIN OPEN.

4.2 THE RETURN AIR HUMIDITY, SENSED BY H-1, SHALL BE MAINTAINED AT SETPOINT BY DCP MODULATING HUMIDITY CONTROL VALVE V-4 TO MAINTAIN THE DESIRED RELATIVE HUMIDITY. THE DCP SHALL OVERRIDE THIS CONTROL TO MAINTAIN A MAXIMUM HUMIDITY OF 80% AS SENSED BY H-2. DCP SHALL CLOSE VALVE V-3 WHENEVER SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH TEMPERATURE SWITCH TO KEEP HUMIDIFIER OFF UNTIL CONDENSATE APPROACHES STEAM TEMPERATURE.

5. FREEZE PROTECTION

5.1 IF THE AIR TEMPERATURE AS SENSED BY T-3 FALLS BELOW 45°F, AN ALARM SIGNAL SHALL BE INDICATED AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F, THE UNIT SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND A CRITICAL ALARM SHALL BE INDICATED AT THE DCP AND ECC. FREEZESTATS MUST REMAIN ACTIVE UNDER ALL OPERATING CONDITIONS INDEPENDENT OF OTHER CONTROLS FOR FAN SHUT DOWN.

6. AUTOMATIC SHUTDOWN/RESTART

6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTORS [F] SD SHOWN ABOVE, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE. EXHAUST FANS SERVING SPACE OF SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

7. EMERGENCY CONSTANT SPEED OPERATION

7.1 ON ALL VSMC FANS IN VAV SYSTEMS UPON FAILURE OF THE VSMC THE FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DCP OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT DESIGN SPEED.

LEGEND

AFM	AIR FLOW MEASURING DEVICE	MONITORS AIR FLOW RATE PROVIDES VELOCITY PRESSURE FOR TRANSMITTAL TO DCP.
AP	DIFFERENTIAL PRESSURE SENSOR	TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITIONS AND STATUS OF FANS.
DCP	DISTRIBUTED CONTROL PANEL	CONTROLS OPERATION OF AIR HANDLING UNIT IN ACCORDANCE WITH THE SEQUENCE OF OPERATION.
D-1	OUTSIDE AIR DAMPER 2 POSITION	OPENS WHEN SUPPLY FAN STARTS AND CLOSES WHEN SUPPLY FAN STOPS.
D-2	RETURN AIR DAMPER MODULATING	PROPORTIONS FLOW OF RETURN AIR IN RESPONSE TO DCP.
D-3	RELIEF AIR DAMPER MODULATING	PROPORTIONS FLOW OF RELIEF AIR IN RESPONSE TO DCP.
ECC	ENGINEERING CONTROL CENTER	LOCATED IN BUILDING 26 FOR MONITORING OF SYSTEM OPERATIONS.
[F] SD	DUCT SMOKE DETECTORS (FURNISHED AND WIRED TO FIRE ALARM PANEL BY ELECTRICAL)	PROVIDE SMOKE SIGNAL TO DCP.
G	PRESSURE GAUGE (SECTION 15880)	FILTER CONDITON INDICATOR
H-1	RETURN AIR HUMIDITY SENSOR	SENSES AND TRANSMITS RETURN AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION.
H-2	SUPPLY AIR HUMIDITY SENSOR	SENSES AND TRANSMITS SUPPLY AIR HUMIDITY TO DCP FOR CONTROL AND INDICATION.
SD-1	RETURN AIR SMOKE DAMPER	CLOSES WHEN UNIT IS SHUT OFF OR WHENEVER SMOKE IS DETECTED BY [F] SD.
SD-2	SUPPLY AIR SMOKE DAMPER	CLOSES WHEN UNIT IS SHUT OFF OR WHENEVER SMOKE IS DETECTED BY [F] SD.
SPS-1	STATIC PRESSURE SENSOR (SEE FLOOR PLANS FOR LOCATION)	SENSES AND TRANSMITS DUCT STATIC PRESSURE TO DCP.
SPS-2	HIGH LIMIT STATIC PRESSURE SENSOR	SENSES AND TRANSMITS SUPPLY STATIC PRESSURE NEAR AHU TO DCP.
T-1	SUPPLY AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION.
T-2	OUTSIDE AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION.
T-3	LEAVING PREHEAT COIL AIR TEMPERATURE SENSOR (FREEZE PROTECTION)	SENSES AND TRANSMITS PREHEAT AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION.
T-4	RETURN AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
T-5	MIXED AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS MIXED AIR BRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
T-6	LEAVING COOLING COIL AIR TEMPERATURE SENSOR	SENSES AND TRANSMITS COOLING COIL DRY BULB TEMPERATURE TO DCP FOR INDICATION ONLY.
V-1	CHILLED WATER CONTROL VALVE STRAIGHT THRU MODULATING TYPE	PROPORTIONS FLOW OF CHILLED WATER TO COOLING COIL IN RESPONSE TO DCP.
V-2	STEAM CONTROL VALVE MODULATING TWO WAY	PROPORTIONS FLOW OF STEAM TO PREHEAT COIL IN RESPONSE TO DCP.
V-3	STEAM CONTROL VALVE TWO POSITION TWO WAY	CONTROLS STEAM FLOW TO HUMIDIFIER.
V-4	STEAM CONTROL VALVE MODULATING TWO WAY	PROPORTIONS FLOW OF STEAM TO HUMIDIFIER IN RESPONSE TO DCP.
VPS	VELOCITY PRESSURE SENSOR	SENSES AND TRANSMITS VELOCITY PRESSURE TO DCP.
VSMC	VARIABLE SPEED MOTOR CONTROLLER WITH MOTOR STARTER	CONTROLS SUPPLY AND RETURN FANS MOTOR SPEED IN RESPONSE TO DCP.

EXISTING CONTROL DEVICES TO REMAIN. REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

CONTROLS LEGEND

T H	ROOM CONTROL: THERMOSTAT, HUMIDISTAT
T	REMOTE BULB THERMOSTAT
T	DUCT OR PIPE THERMOSTAT (NOTE 1: PROVIDE 12" MIN. LENGTH IN DUCT WHEN SPACE PERMITS)
T	DUCT THERMOSTAT WITH AVERAGING ELEMENT
T	ROOM SENSOR: TEMPERATURE
T	DUCT OR PIPE TEMP. SENSOR (SEE NOTE 1 ABOVE)
H	DUCT HUMIDITY SENSOR
Dp	DUCT DEWPOINT SENSOR
SP	DUCT STATIC PRESSURE SENSOR
T	DUCT TEMP. SENSOR WITH AVERAGING ELEMENT
F S	SMOKE DETECTOR (SEE ELECTRICAL SPECIFICATIONS)
	TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO INDICATOR ON LTCP. (SEE NOTE 1 ABOVE)
A	SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO LTCP
M	CONTROL AIR MAIN
I/P	ELECTRO-PNEUMATIC (EP) SWITCH
R2	RELAY COIL
R2-A	CONTACT, NORMALLY OPEN (N.O.)
R2-B	CONTACT, NORMALLY CLOSED (N.C.)
	SWITCH
P	PILOT LIGHT (RED)
HI N	CONTROL CIRCUIT CONN.

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFPPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust control at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved, and shall be provided by the contractor at no additional cost to the government.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 6-6-08 MARK R. McDOWELL

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POWER PLANT
QUAD 'D' | QUAD 'A'
QUAD 'C' | QUAD 'B'
N PROJECT NORTH
KEY PLAN

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: EXISTING CONTROL DIAGRAMS BUILDING 62 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

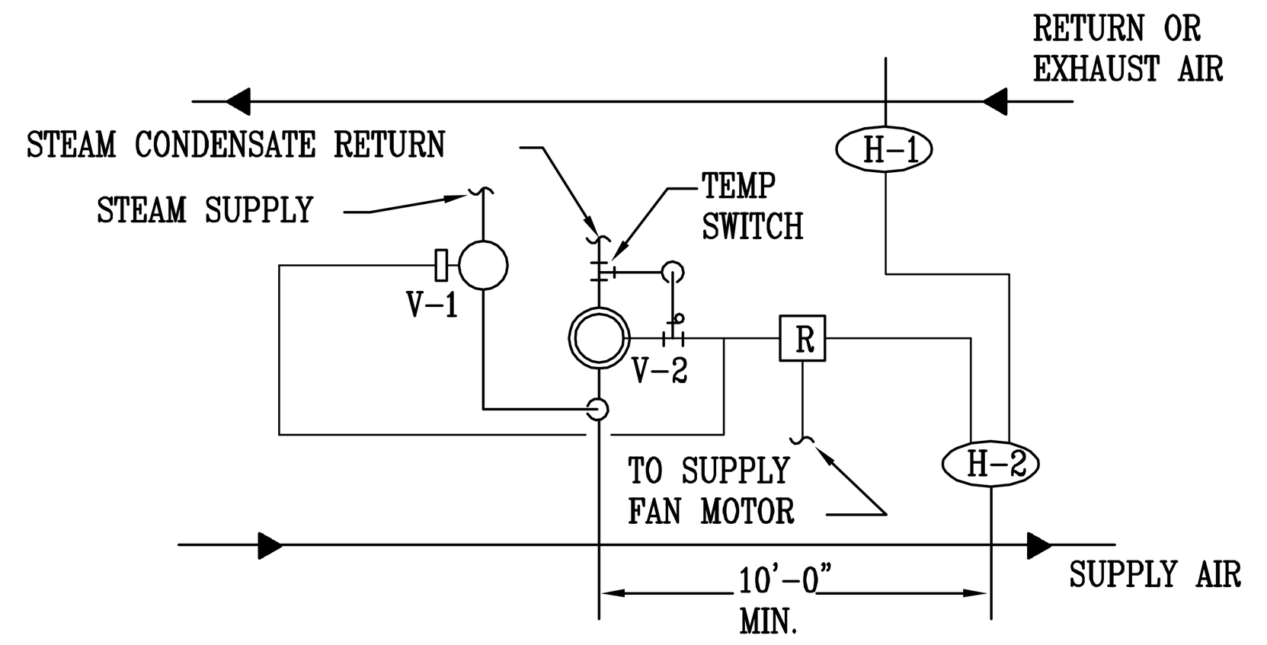
DRAWING NO.: M115 Dwg. 22 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

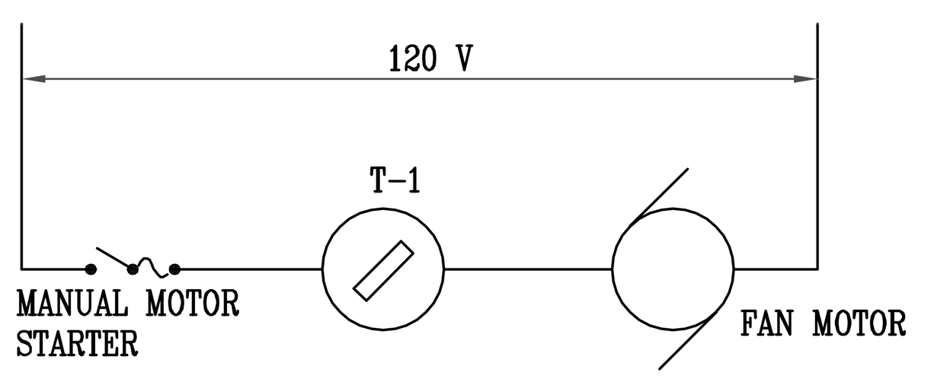
Office of Facilities
Department of Veterans Affairs



NOTES:

1. WHEN DUCT HUMIDISTAT H-1 IS NOT CALLING FOR HUMIDITY ON-OFF TWO WAY CONTROL VALVE V-1 SHALL REMAIN CLOSED. WHEN H-1 IS CALLING FOR HUMIDITY V-1 SHALL OPEN.
2. DUCT HUMIDISTAT H-1 SHALL MODULATE VALVE V-2 TO MAINTAIN THE DESIRED RELATIVE HUMIDITY SUBJECT TO ITS MODULATING TYPE HIGH LIMIT DUCT HUMIDISTAT H-2 SET AT 80% RELATIVE HUMIDITY. VALVE V-1 SHALL CLOSE WHENEVER SUPPLY FAN IS OFF. VALVE V-2 SHALL BE INTERLOCKED WITH TEMPERATURE SWITCH TO KEEP HUMIDIFIER OFF UNTIL CONDENSATE APPROACHES STEAM TEMPERATURE.

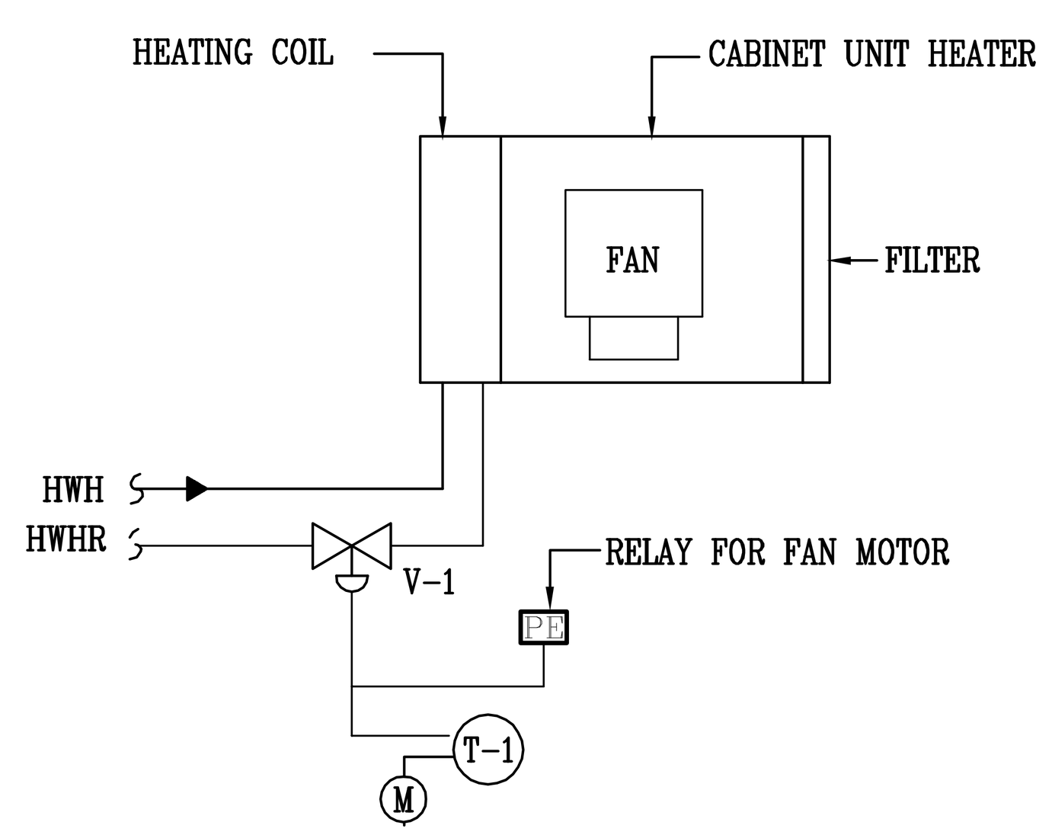
CONTROL FOR STEAM HUMIDIFIERS



SEQUENCE OF OPERATION

1. THE FAN IS CONTROLLED FROM A MANUAL MOTOR STARTER LOCATED NEAR THE UNIT.
2. WALL MOUNTED, LINE VOLTAGE THERMOSTAT T-1 CYCLES THE UNIT FAN TO MAINTAIN SETPOINT. FURNISH THERMOSTAT FOR INSTALLATION WITH MOTOR WIRING.

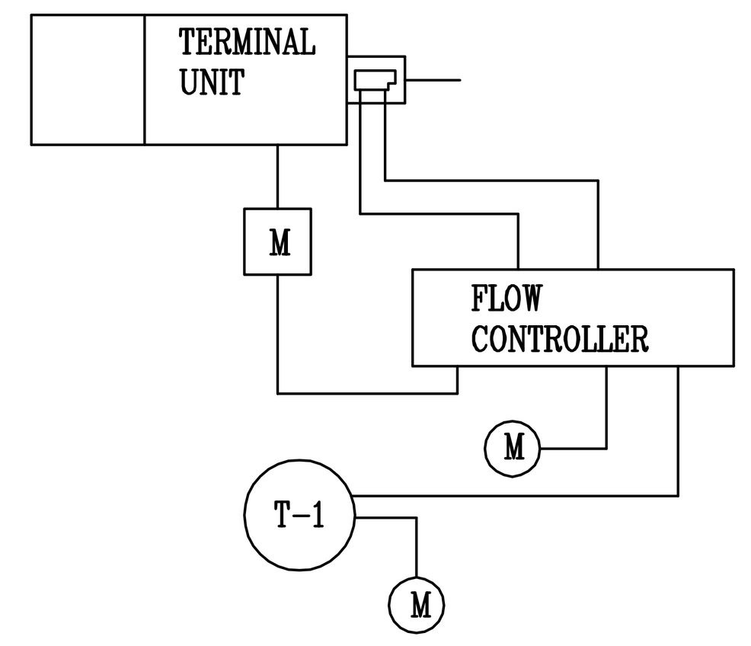
STEAM WATER UNIT HEATER CONTROL



CABINET UNIT HEATER CONTROLS

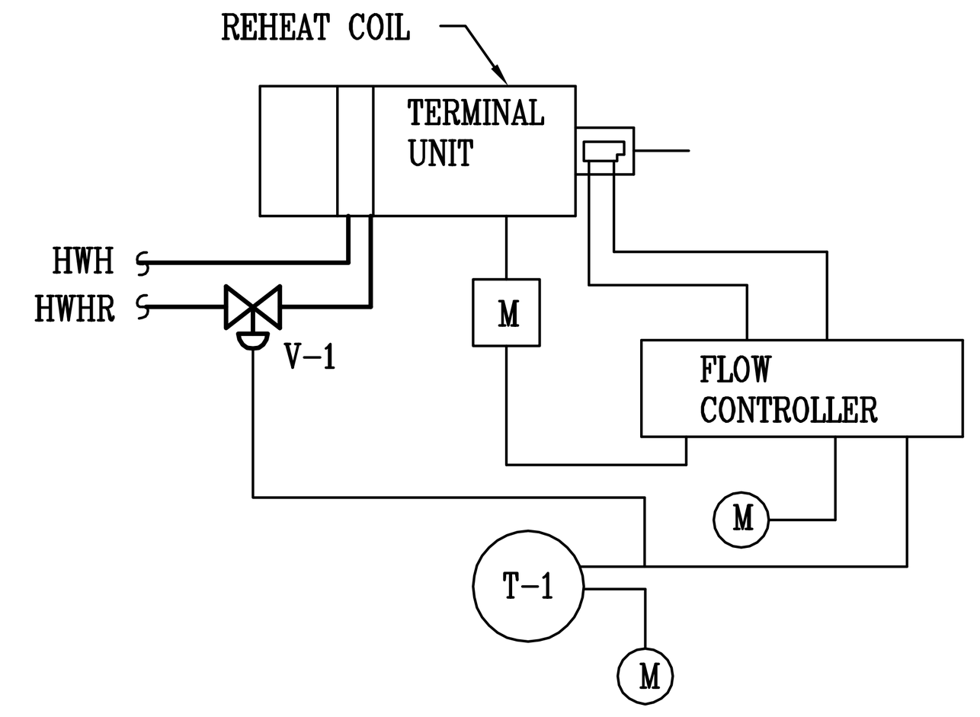
ROOM THERMOSTAT T-1 SHALL CONTROL PNEUMATIC-ELECTRIC RELAY FOR FAN MOTOR AND HEATING COIL VALVE V-1 IN SEQUENCE. ON A DROP IN TEMPERATURE TO THE SET POINT ROOM THERMOSTAT T-1, THRU PNEUMATIC-ELECTRIC RELAY, SHALL START THE FAN. HEATING COIL VALVE V-1 SHALL REMAIN OFF. ON A DROP IN TEMPERTURE SLIGHTLY BELOW THE SETPOINT T-1 SHALL MODULATE HEATING COIL VALVE V-1. FAN SHALL REMAIN ON.

EXISTING CONTROL DEVICES TO REMAIN.
REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.



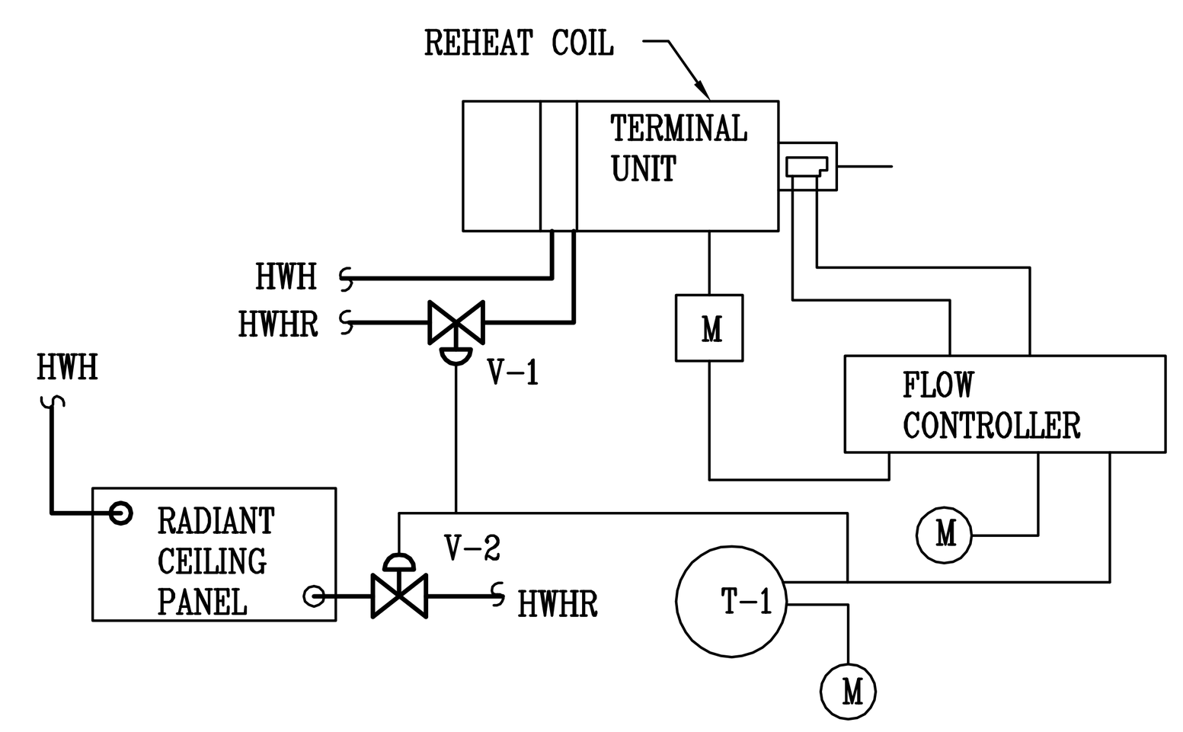
TYPE "B" AIR TERMINAL UNIT CONTROL DIAGRAM
NO REHEAT

ROOM THERMOSTAT T-1 SHALL CONTROL PNEUMATIC OPERATOR FOR VARIABLE CONSTANT VOLUME BOX. ON A DROP IN ROOM TEMPERATURE TO THE SET POINT ROOM THERMOSTAT T-1, THRU PNEUMATIC OPERATOR, SHALL REDUCE AIR FLOW TO THE ROOM TO THE BOXES MINIMUM SETTING.



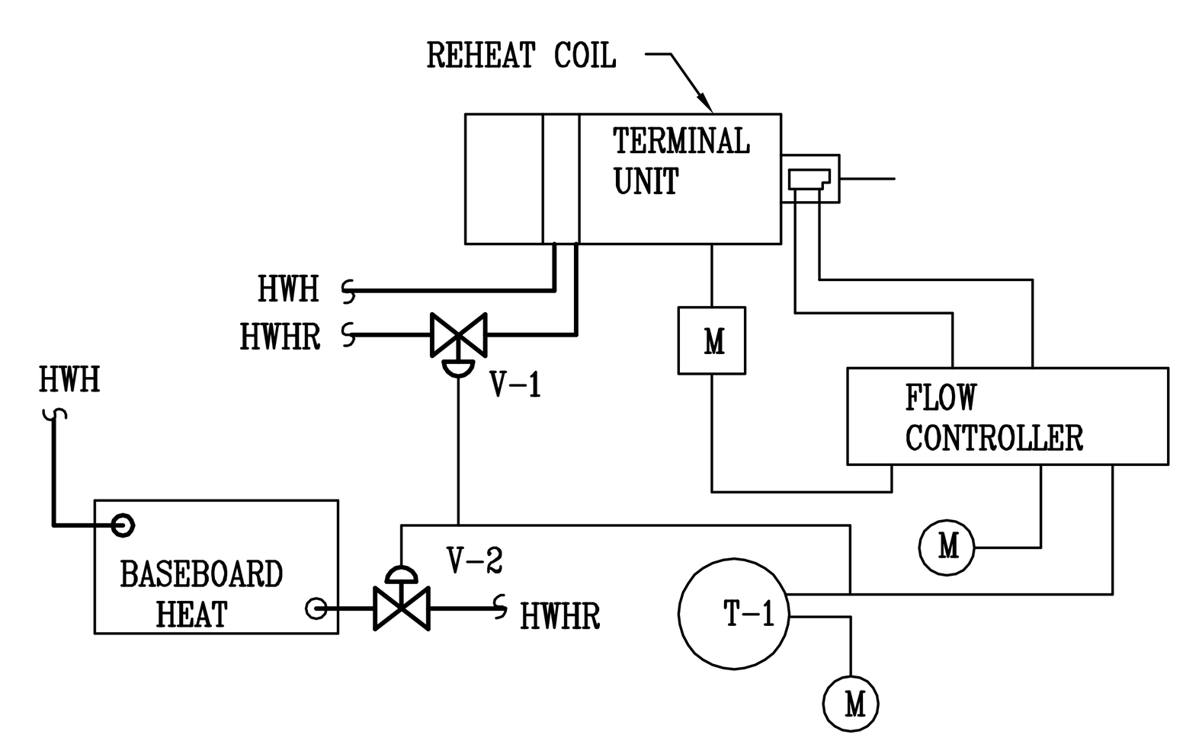
TYPE "C" AIR TERMINAL UNIT CONTROL DIAGRAM
VAV REHEAT

ROOM THERMOSTAT T-1 SHALL CONTROL PNEUMATIC OPERATOR FOR VARIABLE CONSTANT VOLUME REHEAT BOX AND REHEAT COIL VALVE V-1. ON A DROP IN ROOM TEMPERATURE TO THE SET POINT ROOM THERMOSTAT T-1, THRU PNEUMATIC OPERATOR, SHALL REDUCE AIR FLOW TO THE ROOM TO THE BOXES MINIMUM SETTING. ON A FURTHER DROP IN ROOM TEMPERATURE BELOW THE SET POINT ROOM THERMOSTAT T-1 SHALL MODULATE VALVE V-1 TO MAINTAIN THE REQUIRED TEMPERATURE.



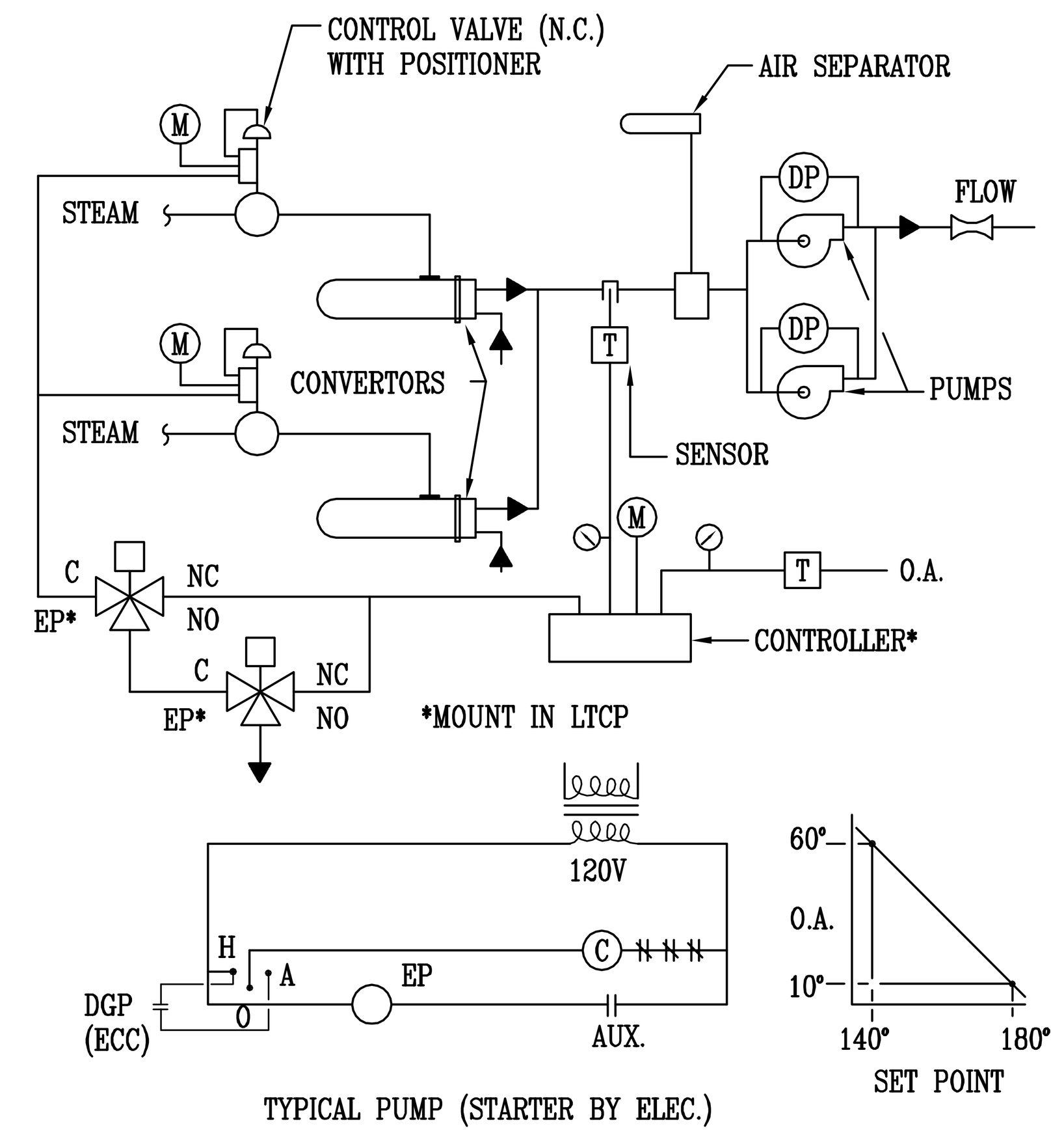
TYPE "D" AIR TERMINAL UNIT CONTROL DIAGRAM
VAV REHEAT WITH PERIMETER RADIANT CEILING PANELS

ROOM THERMOSTAT T-1 SHALL CONTROL PNEUMATIC OPERATOR FOR VARIABLE CONSTANT VOLUME REHEAT BOX, REHEAT COIL VALVE V-1 AND RADIANT CEILING PANEL VALVE V-2. ON A DROP IN ROOM TEMPERATURE TO THE SET POINT ROOM THERMOSTAT T-1, THRU PNEUMATIC OPERATOR, SHALL REDUCE AIR FLOW TO THE ROOM TO THE BOXES MINIMUM SETTING. ON A FURTHER DROP IN ROOM TEMPERATURE BELOW THE SET POINT ROOM THERMOSTAT T-1 SHALL MODULATE VALVES V-1 AND V-2 IN PARALLEL TO MAINTAIN THE REQUIRED TEMPERATURE.



TYPE "E" AIR TERMINAL UNIT CONTROL DIAGRAM
VAV REHEAT WITH PERIMETER BASEBOARD HEAT

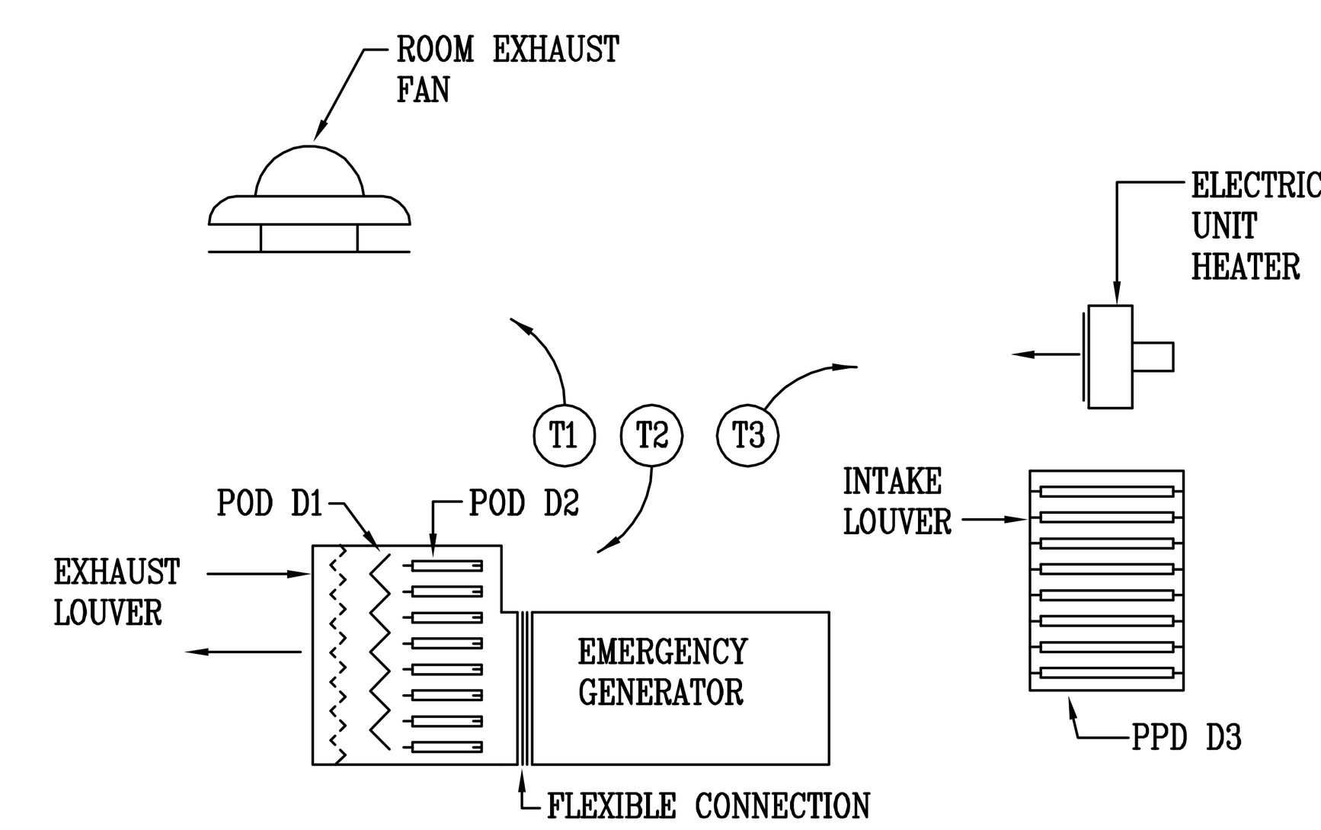
ROOM THERMOSTAT T-1 SHALL CONTROL PNEUMATIC OPERATOR FOR VARIABLE CONSTANT VOLUME REHEAT BOX, REHEAT COIL VALVE V-1 AND RADIANT CEILING PANEL VALVE V-2. ON A DROP IN ROOM TEMPERATURE TO THE SET POINT ROOM THERMOSTAT T-1, THRU PNEUMATIC OPERATOR, SHALL REDUCE AIR FLOW TO THE ROOM TO THE BOXES MINIMUM SETTING. ON A FURTHER DROP IN ROOM TEMPERATURE BELOW THE SET POINT ROOM THERMOSTAT T-1 SHALL MODULATE VALVES V-1 AND V-2 IN PARALLEL TO MAINTAIN THE REQUIRED TEMPERATURE.



SEQUENCE OF OPERATION

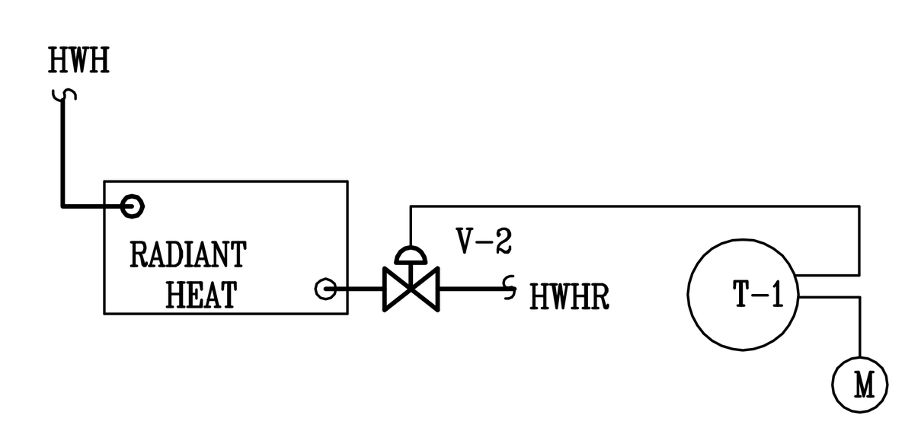
WHEN EITHER OR BOTH PUMPS ARE IN OPERATON, STEAM CONTROL VALVES SHALL MODULATE IN PARALLEL TO MAINTAIN THE SUPPLY TEMPERATURE AT THE CONTROL POINT.
THE SUPPLY TEMPERATURE SHALL BE RESET INVERSELY WITH THE OUTDOOR AIR TEMPERATURE AS SCHEDULED.
PUMPS SHALL BE STAGED ACCORDING TO ACTUAL FLOW. SECOND PUMP SHALL START WHEN FLOW REACHES 50% OF DESIGN.

DUAL CONVERTOR CONTROL



EMERGENCY GENERATOR ROOM CONTROLS

1. EMERGNECY GENERATOR SHALL BE INTERLOCKED WITH PPD D3. WHEN EMERGENCY GENERATOR IS EMERGIZED PPD D3 SHALL OPEN. WHEN EMERGENCY GENERATOR IS DE-ENERGIZED PPD D3 SHALL CLOSE PROVIDED ROOM EXHAUST FAN IS OFF.
2. ROOM EXHAUST FAN SHALL BE INTERLOCKED WITH PPD D3 AND ROOM THERMOSTAT T1. WHEN ROOM THERMOSTAT RISES ABOVE 85°F. ROOM EXHAUST FAN SHALL RUN AND PPD D3 SHALL OPEN. WHEN ROOM THERMOSTAT DROPS BELOW 80°F. ROOM EXHAUST FAN SHALL STOP AND PPD D3 SHALL CLOSE PROVIDED EMERGENCY GENERATOR IS DE-ENERGIZED.
3. POWER OPERATED OPPOSED BLADE DAMPERS D1 AND D2 SHALL BE INTERLOCKED WITH MODULATING ROOM THERMOSTAT T2 SET AT 60°F. ON A RISE IN ROOM TEMPERATURE ABOVE 60°F. D1 SHALL MODULATE OPEN AND D2 SHALL MODULATE CLOSED. ON A DROP IN ROOM TEMPERATURE BELOW 60°F. D1 SHALL MODULATE CLOSED AND D2 SHALL MODULATE OPEN.
4. ELECTRIC UNIT HEATER SHALL BE INTERLOCKED WITH ROOM THERMOSTAT T3 SET AT 45°F. ON A DROP IN ROOM TEMPERATURE BELOW 43°F. ELECTRIC UNIT HEATER SHALL BE ENERGIZED AND ON A RISE IN ROOM TEMPERATURE ABOVE 47°F. ELECTRIC UNIT HEATER SHALL BE DE-ENERGIZED.



TYPE "F" RADIANT CEILING PANEL CONTROL DIAGRAM
FOR TOILET NOT ASSOCIATED WITH PATIENT ROOMS

ROOM THERMOSTAT T-1 SHALL MODULATE CONTROL VALVE V-1 TO MAINTAIN SET POINT. ON A DROP IN ROOM TEMPERTURE BELOW SET POINT, V-1 SHALL MODULATE OPEN.

PACKAGE AIR COOLED WATER CHILLER UNIT CONTROLS

INTERLOCK CHILLED WATER PUMP WITH PACKAGE AIR COOLED WATER CHILLER UNIT. PACKAGE AIR COOLED WATER CHILLER UNIT TO START AUTOMATICALLY WITH MANUFACTURERS RECOMMENDED TIME DELAY AFTER CHILLED WATER PUMP IS STARTED. PACKAGE AIR COOLED WATER CHILLER UNIT TO BE PROVIDED WITH MANUFACTURERS RECOMMENDED SAFETY CONTROLS AND CAPACITY REDUCTION CONTROLS TO PROVIDE SATISFACTORY OPERATION DOWN TO 10% CAPACITY WITH A 40°F AMBIENT TEMPERATURE.

CHILLED WATER SYSTEM SEQUENCE OF OPERATION

1. GENERAL

CHILLED WATER SYSTEM IS CONTROLLED AUTOMATICALLY TO MAINTAIN CHILLED WATER COOLING DEMAND. AUTOMATIC OPERATION MAY BE OVERRIDDEN BY ECC TO START AND STOP CHILLED WATER SYSTEM AT OPERATORS DISCRETION.

2. AUTOMATIC SYSTEM OPERATION

CHILLERS ARE INTERLOCKED TO THEIR RESPECTIVE PRIMARY CHILLED WATER PUMPS. CHILLER NO. 1 TO PUMP P-1, AND CHILLER NO. 2 TO PUMP P-2.

PRIMARY CHILLED WATER PUMPS P-1 AND P-2 ARE SEQUENCED ACCORDING TO SECONDARY FLOW SET POINTS AS MEASURED BY SECONDARY FLOW MEASURING DEVICE.

SECONDARY CHILLED WATER PUMP P-3 OR P-4 SHALL START WHEN ANY COOLING COIL CONTROL VAVLE OPENS AND STOP WHEN ALL COOLING COIL CONTROL VALVES ARE CLOSED. CONTROL VALVES HAVE END SWITCHES.

3. BY-PASS CONTROL

SECONDARY BY-PASS CONTROL VALVE SHALL OPEN WHEN COOOLING CONTROL VALVES CLOSE, AND CLOSE WHEN COOLING CONTROL VALVES OPEN TO MAINTAIN 15 PERCENT OF DESIGN FLOW.

4. TIME DELAY

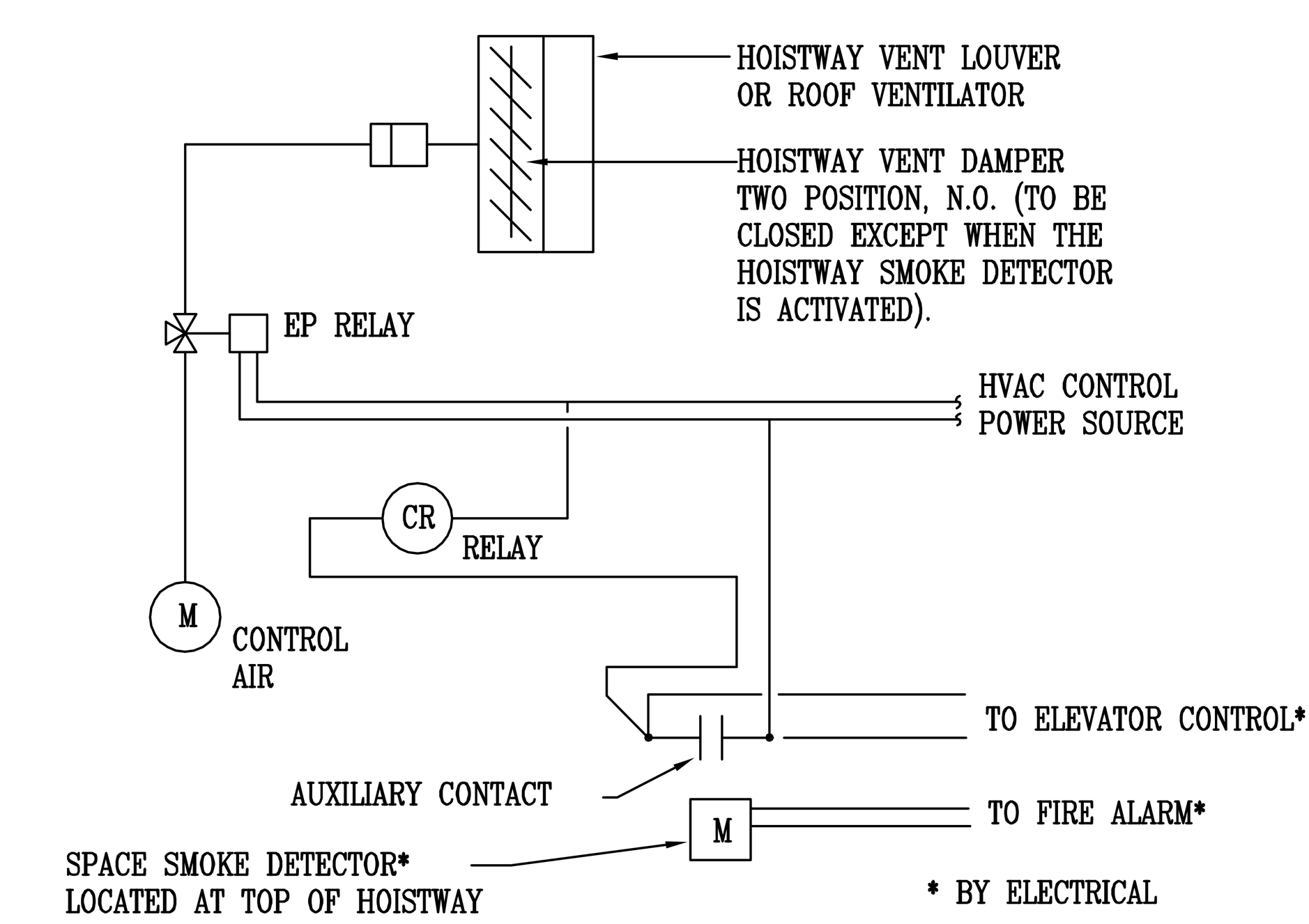
ADJUSTABLE TIME DELAYS SHALL LOCKOUT EACH CHANGE IN PUMP STATUS TO PREVENT OVER CYCLING AND/OR HUNTING.

5. LEAD/LAG CONTROL

PRIMARY AND SECONDARY CHILLED WATER PUMPS AND CHILLERS SHALL HAVE LEAD/LAG CONTROL TO ALTERNATE RUN TIME FOR EACH PUMP AND CHILLER AS DESIGNATED BY ECC.

6. TIME SEQUENCE

COOLING COIL CONTROL VALVE(S) OPEN.
END SWITCH SIGNALS DCP TO START CHILLED WATER SYSTEM.
TIME LOCK OUT CLOCK BEGINS.
AUDIBLE SIGNAL SOUNDS AT ECC.
LEAD SECONDARY CHILLED WATER PUMP STARTS.
PROOF OF RUNNING.
LEAD PRIMARY CHILLED WATER PUMP STARTS.
PROOF OF RUNNING.
LEAD CHILLER CONTROLS ACTIVATED.
CHILLER SAFETIES PROVE NORMAL.
CHILLER STARTS.
15-20% FLOW - TIME LOCK OUT CLOCK MAINTAINS CURRENT FUNCTIONS FOR SYSTEM STABILIZATION.
40% FLOW - BY-PASS CONTROL VALVE CLOSES WHEN SECONDARY FLOW REACHES SET POINT.
ABOVE 50% FLOW - TIME LOCK OUT CLOCK BEGINS.
AUDIBLE SIGNAL SOUNDS AT ECC.
LAG SECONDARY PUMP STARTS
PROOF OF RUNNING.
LAG PRIMARY PUMP STARTS.
PROOF OF RUNNING.
LAG CHILLER CONTROLS ACTIVATED.
LAG CHILLER SAFETIES PROVE NORMAL.
LAG CHILLER STARTS.
BELOW 50% FLOW - TIME LOCKOUT CLOCK BEGINS.
AUDIBLE SIGNAL SOUNDS AT ECC.
LAG CHILLER AND LAG PRIMARY AND LAG SECONDARY CHILLED WATER PUMPS STOP.
BELOW 40 % FLOW - BY-PASS CONTROL VALVE OPENS.
COOLING COIL VALVES ALL CLOSE.
TIME LOCK OUT CLOCK BEGINS.
AUBIBLE SIGNAL SOUNDS AT ECC.
LEAD CHILLER, LEAD PRIMARY AND LEAD SECONDARY CHILLED WATER PUMPS STOP.



HOISTWAY VENT DAMPER (HVD) CONTROL

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the govenment.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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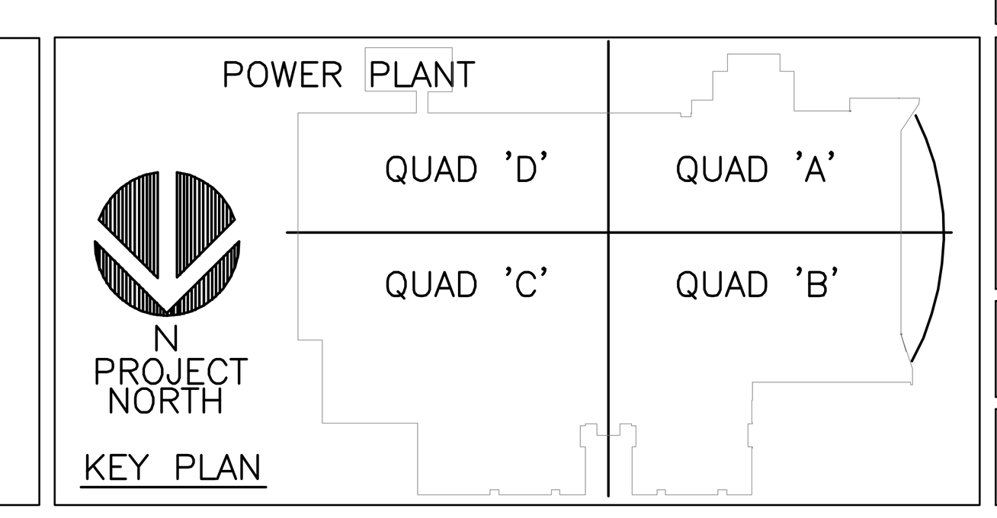

KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: EXISTING CONTROL DIAGRAMS BUILDING 62 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M116

Dwg. 23 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs

ENGINEERING CONTROL CENTER (ECC) DOT MATRIX CONTROL POINT SCHEDULE

EXISTING CONTROL DEVICES TO REMAIN. REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

INPUTS

	SYSTEM POINT DESCRIPTION	ANALOG: OUTSIDE AIR TEMPERATURE °F.	DUCT TEMPERATURE °F.	WATER TEMPERATURE °F.	STATIC PRESSURE IN. WG.	DIFFERENTIAL PRESSURE	% RELATIVE HUMIDITY	FLOW (CFM, GPM)	POSITION INDICATION	KW	MOTOR AMPS	BTU	STEAM PRESSURE (PSIG)	LBS./HR.	PRESSURE (PSIG)	BINARY: STATIC PRESSURE IN. WG.	STATUS ON-OFF	STATUS OPEN-CLOSE	FILTER STATUS	LOW TEMPERATURE CUTOUT	FLOW SWITCH	SWITCH CLOSURE	END SWITCH	STEAM PRESSURE (PSIG)
1	AIR HANDLING UNITS																							
2																								
3	AH-1 SYSTEM (VAV)																							
4	SF-1 SUPPLY FAN				X	X		X								X	X							
5	SF-1 SUPPLY FAN SPEED																							
6	RF-1 RETURN FAN					X		X								X	X							
7	RF-1 RETURN FAN SPEED																							
8																								
9	MINIMUM OUTSIDE AIR DAMPER																	X					X	
10	MAXIMUM OUTSIDE AIR DAMPER								X														X	
11	RETURN AIR DAMPER								X														X	
12	RELIEF AIR DAMPER								X														X	
13																								
14	PF-1 PREFILTER																							
15	AF-1 AFTER FILTER																							
16	CAF-1 CARBON FILTER																							
17	HC-1 HEATING COIL VALVE		X						X														X	
18	CC-1 COOLING COIL VALVE		X						X											X			X	
19																								
20																								
21																								
22	SMOKE DETECTOR SUPPLY																					X		
23	SMOKE DETECTOR RETURN																					X		
24	SMOKE DAMPERS (RETURN AIR)																	X					X	
25	SMOKE DAMPERS (SUPPLY AIR)																	X					X	
26	OUTSIDE AIR	X					X																	
27	MIXED AIR		X																					
28	SUPPLY AIR		X				X																	
29	RETURN AIR		X				X																	
30																								
31																								
32																								
33	AH-2 SYSTEM (VAV)																							
34	SF-2 SUPPLY FAN				X	X		X								X	X							
35	SF-2 SUPPLY FAN SPEED																							
36	RF-2 RETURN FAN					X		X								X	X							
37	RF-2 RETURN FAN SPEED																							
38																								
39	MINIMUM OUTSIDE AIR DAMPER																	X					X	
40	MAXIMUM OUTSIDE AIR DAMPER								X														X	
41	RETURN AIR DAMPER								X														X	
42	RELIEF AIR DAMPER								X														X	
43																								
44	PF-2 PREFILTER																							
45	AF-2 AFTER FILTER																							
46	CAR-2 CARBON FILTER																							
47	HC-2 HEATING COIL VALVE		X						X														X	
48	CC-2 COOLING COIL VALVE		X						X											X			X	
49	HUMIDIFIER ON-OFF VALVE																	X					X	
50	SH-2 HUMIDIFIER MODULATING VALVE								X														X	
51																								
52	SMOKE DETECTOR SUPPLY																					X		
53	SMOKE DETECTOR RETURN																					X		
54	SMOKE DAMPERS (RETURN AIR)																	X					X	
55	SMOKE DAMPERS (SUPPLY AIR)																	X					X	
56	OUTSIDE AIR	X					X																	
57	MIXED AIR		X																					
58	SUPPLY AIR		X				X																	
59	RETURN AIR		X				X																	
60																								
61																								
62																								
63	AH-3 SYSTEM (VAV)																							
64	SF-3 SUPPLY FAN				X	X		X								X	X							
65	SF-3 SUPPLY FAN SPEED																							
66	RF-3 RETURN FAN					X		X								X	X							
67	RF-3 RETURN FAN SPEED																							
68																								
69	MINIMUM OUTSIDE AIR DAMPER																	X					X	
70	MAXIMUM OUTSIDE AIR DAMPER								X														X	
71	RETURN AIR DAMPER								X														X	
72	RELIEF AIR DAMPER								X														X	
73																								
74	PF-3 PREFILTER																							
75	AF-3 AFTER FILTER																							
76	CAR-3 CARBON FILTER																							

OUTPUTS

	SYSTEM POINT DESCRIPTION	ANALOG: MODULATING ACTUATOR	SET POINT ADJUSTMENT	VARIABLE SPEED	RESET POSITION	BINARY: CONTROL RELAY	SOLENOID	START/STOP	2-POSITION ACTUATOR MODULATION
1	AIR HANDLING UNITS								
2									
3	AH-1 SYSTEM (VAV)								
4	SF-1 SUPPLY FAN							X	
5	SF-1 SUPPLY FAN SPEED			X					
6	RF-1 RETURN FAN							X	
7	RF-1 RETURN FAN SPEED			X					
8									
9	MINIMUM OUTSIDE AIR DAMPER								X
10	MAXIMUM OUTSIDE AIR DAMPER	X			X				
11	RETURN AIR DAMPER	X			X				
12	RELIEF AIR DAMPER	X			X				
13									
14	PF-1 PREFILTER								
15	AF-1 AFTER FILTER								
16	CAF-1 CARBON FILTER								
17	HC-1 HEATING COIL VALVE	X			X				
18	CC-1 COOLING COIL VALVE	X			X				
19									
20									
21									
22	SMOKE DETECTOR SUPPLY								
23	SMOKE DETECTOR RETURN								
24	SMOKE DAMPERS (RETURN AIR)				X				X
25	SMOKE DAMPERS (SUPPLY AIR)				X				X
26	OUTSIDE AIR								
27	MIXED AIR								
28	SUPPLY AIR								
29	RETURN AIR								
30									
31									
32									
33	AH-2 SYSTEM (VAV)								
34	SF-2 SUPPLY FAN							X	
35	SF-2 SUPPLY FAN SPEED			X					
36	RF-2 RETURN FAN							X	
37	RF-2 RETURN FAN SPEED			X					
38									
39	MINIMUM OUTSIDE AIR DAMPER								X
40	MAXIMUM OUTSIDE AIR DAMPER	X			X				
41	RETURN AIR DAMPER	X			X				
42	RELIEF AIR DAMPER	X			X				
43									
44	PF-2 PREFILTER								
45	AF-2 AFTER FILTER								
46	CAR-2 CARBON FILTER								
47	HC-2 HEATING COIL VALVE	X			X				
48	CC-2 COOLING COIL VALVE	X			X				
49	HUMIDIFIER ON-OFF VALVE								X
50	SH-2 HUMIDIFIER MODULATING VALVE	X							
51									
52	SMOKE DETECTOR SUPPLY								
53	SMOKE DETECTOR RETURN								
54	SMOKE DAMPERS (RETURN AIR)				X				X
55	SMOKE DAMPERS (SUPPLY AIR)				X				X
56	OUTSIDE AIR								
57	MIXED AIR								
58	SUPPLY AIR								
59	RETURN AIR								
60									
61									
62									
63	AH-3 SYSTEM (VAV)								
64	SF-3 SUPPLY FAN							X	
65	SF-3 SUPPLY FAN SPEED			X					
66	RF-3 RETURN FAN							X	
67	RF-3 RETURN FAN SPEED			X					
68									
69	MINIMUM OUTSIDE AIR DAMPER								X
70	MAXIMUM OUTSIDE AIR DAMPER	X			X				
71	RETURN AIR DAMPER	X			X				
72	RELIEF AIR DAMPER	X			X				
73									
74	PF-3 PREFILTER								
75	AF-3 AFTER FILTER								
76	CAR-3 CARBON FILTER								

SYSTEM FEATURES

	SYSTEM POINT DESCRIPTION	ALARM: HIGH LIMIT	LOW LIMIT	RUN TIME	SMOKE/FIRE	MAINTENANCE MESSAGE	SENSOR FAIL	FLOW FAIL	dP FILTER	FREEZE STAT	STATUS ABNORMAL	PROGRAMS: OPTIMIZED START	DUTY CYCLING	HOT WATER RESET W/O.A. TEMP.	VAV CONTROL	ENTHALPY CONTROL (ECONOMIZER)	AUTOMATIC RESTART	PREVENTATIVE MAINTENANCE	SMOKE SHUT-DOWN	TREND LOG	ALARM INSTRUCTION	COLOR GRAPHICS
1	AIR HANDLING UNITS																					
2																						
3	AH-1 SYSTEM (VAV)											X	X		X	X			X		X	X
4	SF-1 SUPPLY FAN	X		X		X		X			X						X	X	X			
5	SF-1 SUPPLY FAN SPEED	X	X																			
6	RF-1 RETURN FAN			X		X		X			X							X	X			
7	RF-1 RETURN FAN SPEED	X	X																			
8																						
9	MINIMUM OUTSIDE AIR DAMPER																					
10	MAXIMUM OUTSIDE AIR DAMPER																					
11	RETURN AIR DAMPER																					
12	RELIEF AIR DAMPER																					
13																						
14	PF-1 PREFILTER								X									X		X		
15	AF-1 AFTER FILTER								X									X		X		
16	CAF-1 CARBON FILTER																	X		X		
17	HC-1 HEATING COIL VALVE										X											
18	CC-1 COOLING COIL VALVE									X	X											
19																						
20																						
21																						
22	SMOKE DETECTOR SUPPLY				X		X												X			
23	SMOKE DETECTOR RETURN				X		X												X			
24	SMOKE DAMPERS (RETURN AIR)																		X			
25	SMOKE DAMPERS (SUPPLY AIR)																		X			
26	OUTSIDE AIR						X															
27	MIXED AIR						X															
28	SUPPLY AIR						X				X											
29	RETURN AIR						X															
30																						
31																						
32																						
33	AH-2 SYSTEM (VAV)											X	X		X	X			X		X	X
34	SF-2 SUPPLY FAN	X		X		X		X			X						X	X	X			
35	SF-2 SUPPLY FAN SPEED	X	X																			
36	RF-2 RETURN FAN			X		X		X			X							X	X			
37	RF-2 RETURN FAN SPEED	X	X																			
38																						
39	MINIMUM OUTSIDE AIR DAMPER																					
40	MAXIMUM OUTSIDE AIR DAMPER																					
41	RETURN AIR DAMPER																					
42	RELIEF AIR DAMPER																					
43																						
44	PF-2 PREFILTER								X									X		X		
45	AF-2 AFTER FILTER								X									X		X		
46	CAR-2 CARBON FILTER																	X		X		
47	HC-2 HEATING COIL VALVE										X											
48	CC-2 COOLING COIL VALVE									X	X											
49	HUMIDIFIER ON-OFF VALVE																					
50	SH-2 HUMIDIFIER MODULATING VALVE										X											
51																						
52	SMOKE DETECTOR SUPPLY				X		X												X			
53	SMOKE DETECTOR RETURN				X		X												X			
54	SMOKE DAMPERS (RETURN AIR)																		X			
55	SMOKE DAMPERS (SUPPLY AIR)																		X			
56	OUTSIDE AIR						X															
57	MIXED AIR						X															
58	SUPPLY AIR						X				X											
59	RETURN AIR						X															
60																						
61																						
62																						
63	AH-3 SYSTEM (VAV)											X	X		X	X			X		X	X
64	SF-3 SUPPLY FAN	X		X		X		X			X						X	X	X			
65	SF-3 SUPPLY FAN SPEED	X	X																			
66	RF-3 RETURN FAN			X		X		X			X							X	X			
67	RF-3 RETURN FAN SPEED	X	X																			
68																						
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71	RETURN AIR DAMPER																					
72	RELIEF AIR DAMPER																					
73																						
74	PF-3 PREFILTER								X									X		X		
75	AF-3 AFTER FILTER								X									X		X		
76	CAR-3 CARBON FILTER																	X		X		

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
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Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R. McDOWELL 6-6-08

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KEY PLAN: POWER PLANT; QUAD 'D'; QUAD 'A'; QUAD 'C'; QUAD 'B'; N PROJECT NORTH

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: EXISTING DDC POINTS LIST BUILDING 62 - BASE BID

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M117

Dwg. 24 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities

Department of Veterans Affairs

ENGINEERING CONTROL CENTER (ECC) DOT MATRIX CONTROL POINT SCHEDULE

EXISTING CONTROL DEVICES TO REMAIN. REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

	SYSTEM POINT DESCRIPTION	INPUTS: ANALOG: OUTSIDE AIR TEMPERATURE °F.	DUCT TEMPERATURE °F.	WATER TEMPERATURE °F.	STATIC PRESSURE IN. WG.	DIFFERENTIAL PRESSURE	% RELATIVE HUMIDITY	FLOW (CFM, GPM)	POSITION INDICATION	KW	MOTOR AMPS	BTU	STEAM PRESSURE (PSIG)	LBS/HR.	PRESSURE (PSIG)
	AIR HANDLING UNITS (CONTINUED)														
77	HC-3 HEATING COIL VALVE		X						X						
78	CC-3 COOLING COIL VALVE		X						X						
79	HUMIDIFIER ON-OFF VALVE								X						
80	SH-3 HUMIDIFIER MODULATING VALVE								X						
81															
82	SMOKE DETECTOR SUPPLY														
83	SMOKE DETECTOR RETURN														
84	SMOKE DAMPERS (RETURN AIR)														
85	SMOKE DAMPERS (SUPPLY AIR)														
86	OUTSIDE AIR	X					X								
87	MIXED AIR		X												
88	SUPPLY AIR		X				X								
89	RETURN AIR		X				X								
90															
91															
92															
93	CHILLED WATER SYSTEM														
94	ACRCU-1 AIR COOLED RECIPROC. CHILLER									X	X	X			
95	ACRCU-2 AIR COOLED RECIPROC. CHILLER									X	X	X			
96	CHILLERS OUTPUT														
97	CHILLERS INPUT														
98	P-1 PRIMARY PUMP					X									
99	P-2 PRIMARY PUMP					X									
100	PRIMARY CHILLED WATER (SUPPLY)						X								
101	PRIMARY CHILLED WATER (RETURN)			X											
102	P-3 SECONDARY PUMP					X									
103	P-4 SECONDARY PUMP					X									
104	SECONDARY CHILLED WATER (SUPPLY)			X											
105	SECONDARY CHILLED WATER (RETURN)			X											
106	CH BY-PASS CONTROL VALVE														
107															
108															
109															
110	STEAM SYSTEM														
111	HIGH PRESSURE STEAM SUPPLY											X	X		
112	PRESSURE REDUCING VALVE (INLET)														X
113	PRESSURE REDUCING VALVE (OUTLET)												X		
114															
115															
116															
117	HOT WATER HEATING SYSTEM														
118	C-1 CONVERTOR (VALVE)								X						
119	C-2 CONVERTOR (VALVE)								X						
120	P-5 PUMP					X									
121	P-6 PUMP					X									
122	HOT WATER (SUPPLY)			X											
123	HOT WATER (RETURN)			X											
124															
125															
126															
127															
128	EMERGENCY GENERATOR														
129															
130															
131															
132	MEDICAL GASES														
133	MEDICAL COMPRESSED AIR										X				
134	MEDICAL VACUUM										X				
135	OXYGEN										X				
136															
137															
138															
139															
140	DOMESTIC WATER														
141	DOMESTIC COLD WATER			X											
142	DOMESTIC HOT WATER			X											
143	DOMESTIC HOT WATER PUMPS					X									
144															
145															
146	BATTERY ROOM EXHAUST FAN					X									
147															
148															
149															
150															
151															
152															

INPUTS: BINARY: STATIC PRESSURE IN. WG. | STATUS ON-OFF | STATUS OPEN-CLOSE | FILTER STATUS | LOW TEMPERATURE CUTOUT | FLOW SWITCH | SWITCH CLOSURE | END SWITCH | STEAM PRESSURE (PSIG)

OUTPUTS: ANALOG: MODULATING ACTUATOR | SET POINT ADJUSTMENT | VARIABLE SPEED | RESET POSITION

OUTPUTS: BINARY: START/STOP | 2-POSITION ACTUATOR MODULATION

SYSTEM FEATURES: ALARM: HIGH LIMIT | LOW LIMIT | RUN TIME | SMOKE/FIRE | MAINTENANCE MESSAGE | SENSOR FAIL | FLOW FAIL | dP FILTER | FREEZE STAT | STATUS ABNORMAL

SYSTEM FEATURES: PROGRAMS: OPTIMIZED START | DUTY CYCLING | HOT WATER RESET W/O.A. TEMP. | VAV CONTROL | ENTHALPY CONTROL (ECONOMIZER) | AUTOMATIC RESTART | PREVENTATIVE MAINTENANCE | SMOKE SHUT-DOWN | TREND LOG | ALARM INSTRUCTION | COLOR GRAPHICS

GENERAL NOTE:
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2. Schedule on site inspections with the project COTR.
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4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
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13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

CONFIDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Revisions	Date

Seal: NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT SEAL 024539 MARK R. MCDOWELL

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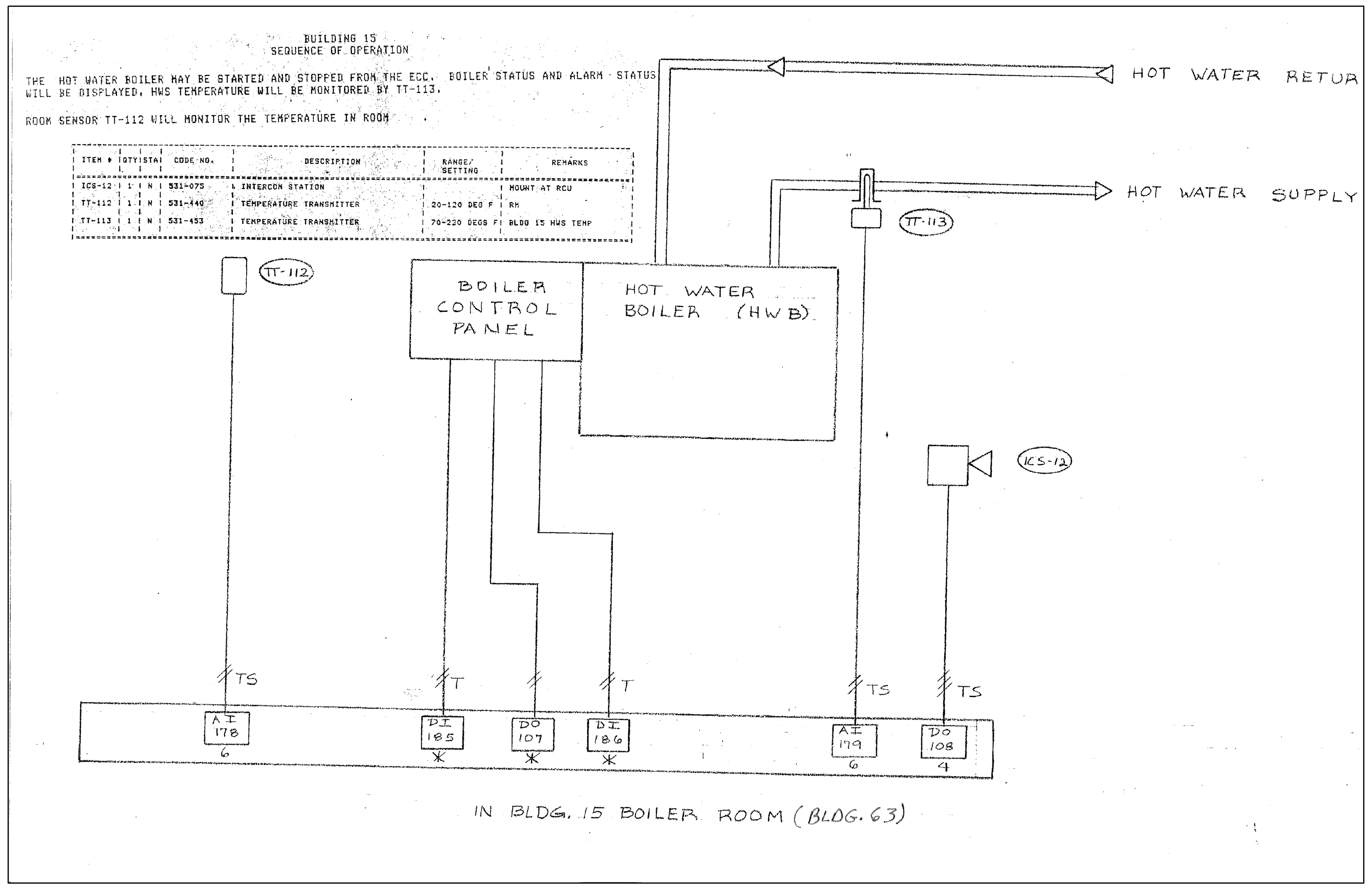
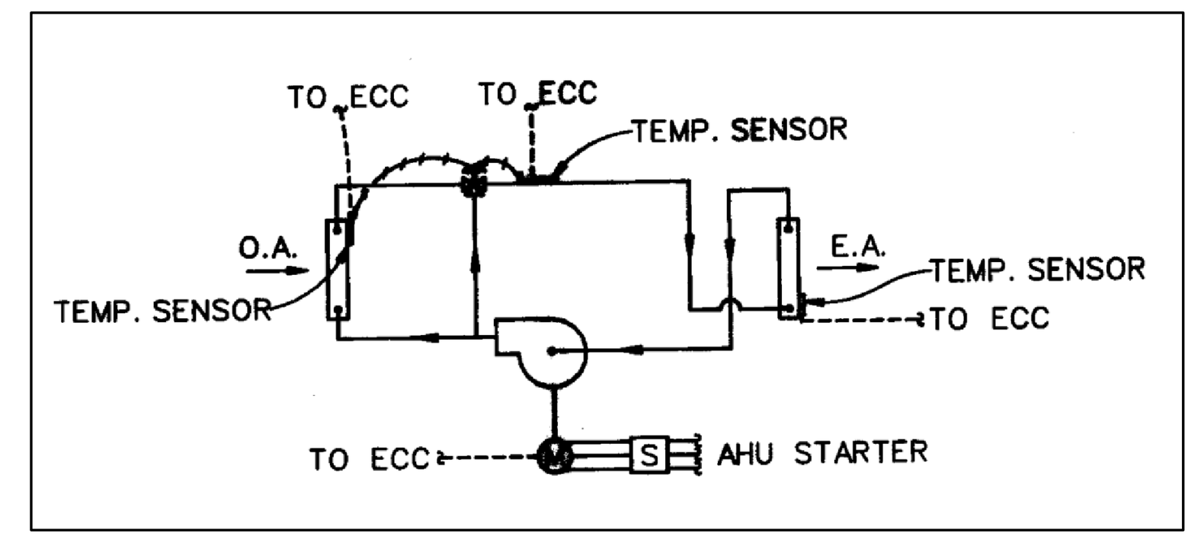
POWER PLANT — QUAD 'D' | QUAD 'A' | QUAD 'C' | QUAD 'B'
N PROJECT NORTH
KEY PLAN

Drawing Title	EXISTING DDC POINTS LIST BUILDING 62 - BASE BID
Project Title	VA MEDICAL CENTER REPLACE HVAC CONTROLS
Date	03-13-08
Project No.	637-08-103
Approved By:	
Building Number	47
Checked	MRM
Drawn	WTJ
DRAWING NO.	M118
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	
Location	ASHEVILLE, N.C.
Dwg. 25 Of 29	

Office of Facilities — Department of Veterans Affairs



BOILER ROOM DIAGRAMS
NOT TO SCALE



SCHEMATIC – RUN-AROUND COILS
NOT TO SCALE

LEGEND

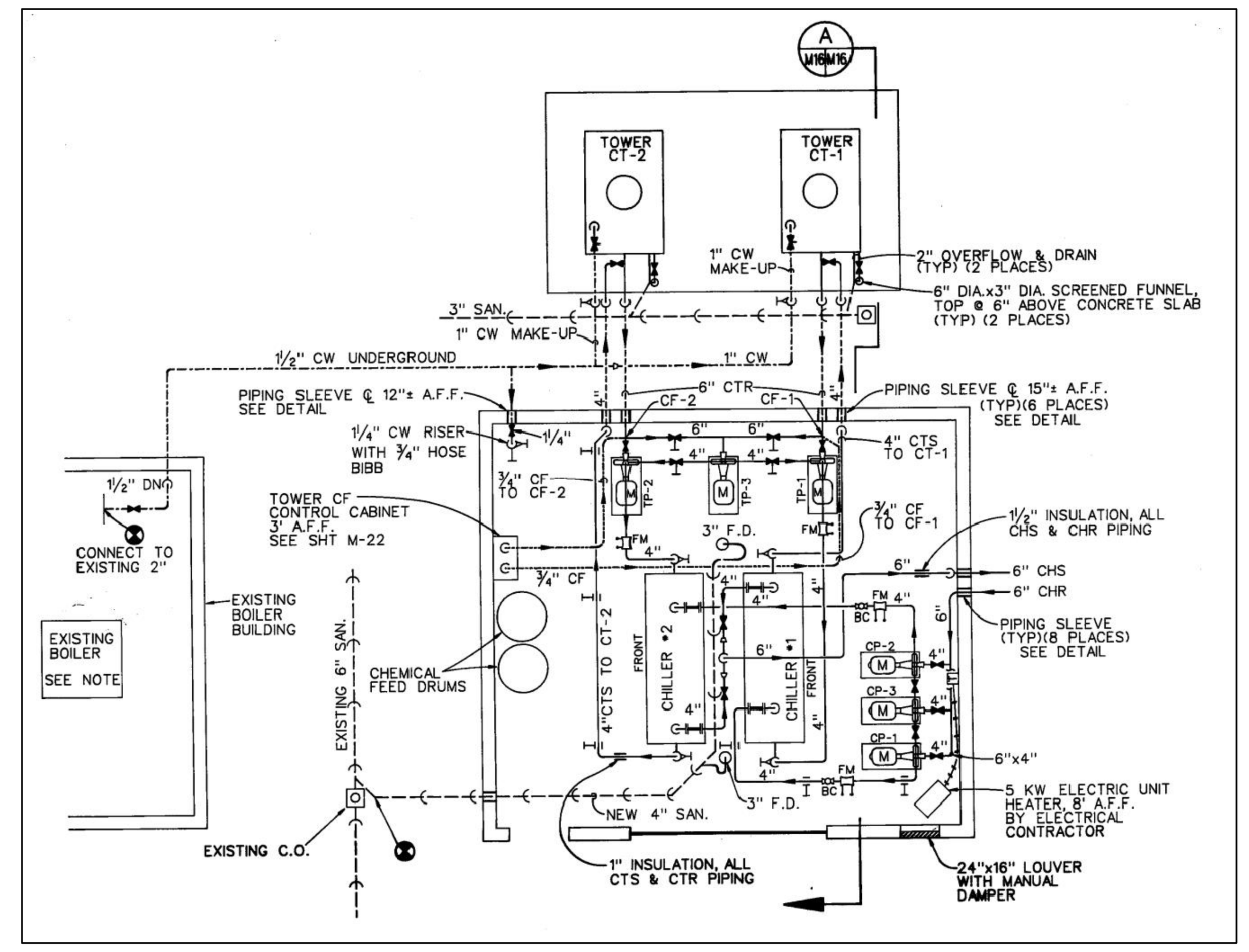
CHS ---------- CHILL WATER SUPPLY
CHR ---------- CHILL WATER RETURN
CTS ---------- COOL TOWER SUPPLY
CTR ---------- COOL TOWER RETURN
FS ---------- FLOW SWITCHES
TE ---------- TERMPERATURE ELEMENT
CM ---------- CONTROL MEDIUM (AIR OR ELECTRIC)
CC ---------- CONTROL CENTER
M ---------- MOTOR, PUMP/TOWER
TOA ---------- OUTSIDE THERMOSTAT
FM ---------- FLOW METER
BC ---------- BALANCE COCK VALVE
CW ---------- COLD WATER MAKE-UP
---------- CONTROL WIRE TO CHILLER CONTROL
F.D. ---------- FLOOR DRAIN
C.O. ---------- CLEAN OUT
---------- SANITARY SEWER
CF ---------- CHEMICAL FEED TOWER

LEGEND
NO SCALE

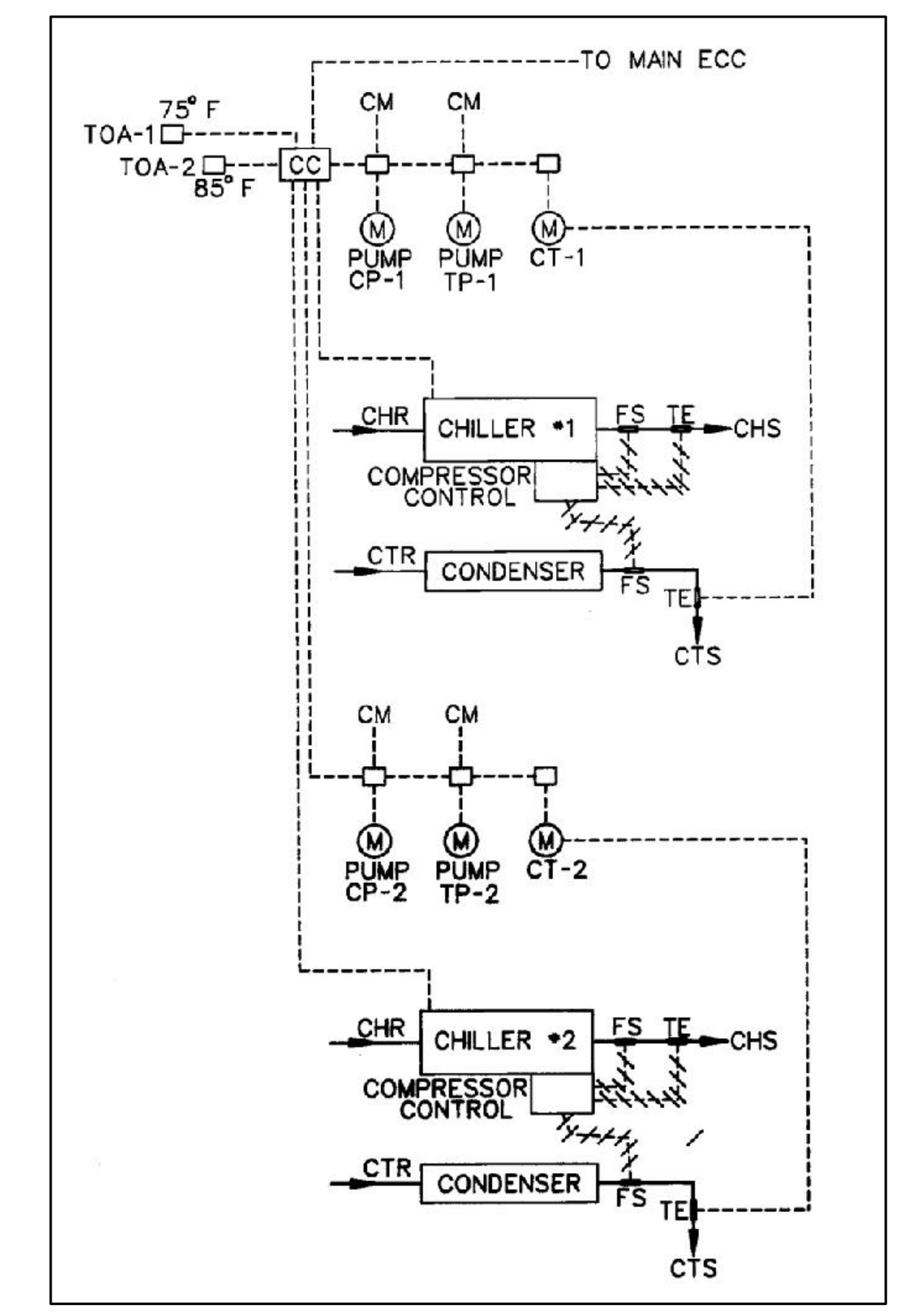
LEGEND

M	MOTOR
S	STARTER
Tc	COOLING T'STAT
T_H	HEATING T'STAT
T_F	FREEZE STAT
B.C.	BALANCING COCK VALVE
CHS	CHILL W. SUPPLY
CHR	CHILL W. RETURN
O.A.	OUTSIDE AIR
S.A.	SUPPLY AIR
ΔP⊘	FILTER PRESSURE DROP
CV-C	CHILL WATER CONTROL
CV-H	HOT WATER CONTROL
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
AFS	AIR FLOW SWITCH
F.E.	FLOW METER ELEMENT
TEA	ENTERING AIR TEMP. SENSOR
TLA	LEAVING AIR TEMP. SENSOR
ECC	ENGINEERING CONTROL CENTER

LEGEND
NOT TO SCALE



CHILLER / BUILDING PLAN (BLDG. 65)
NOT TO SCALE



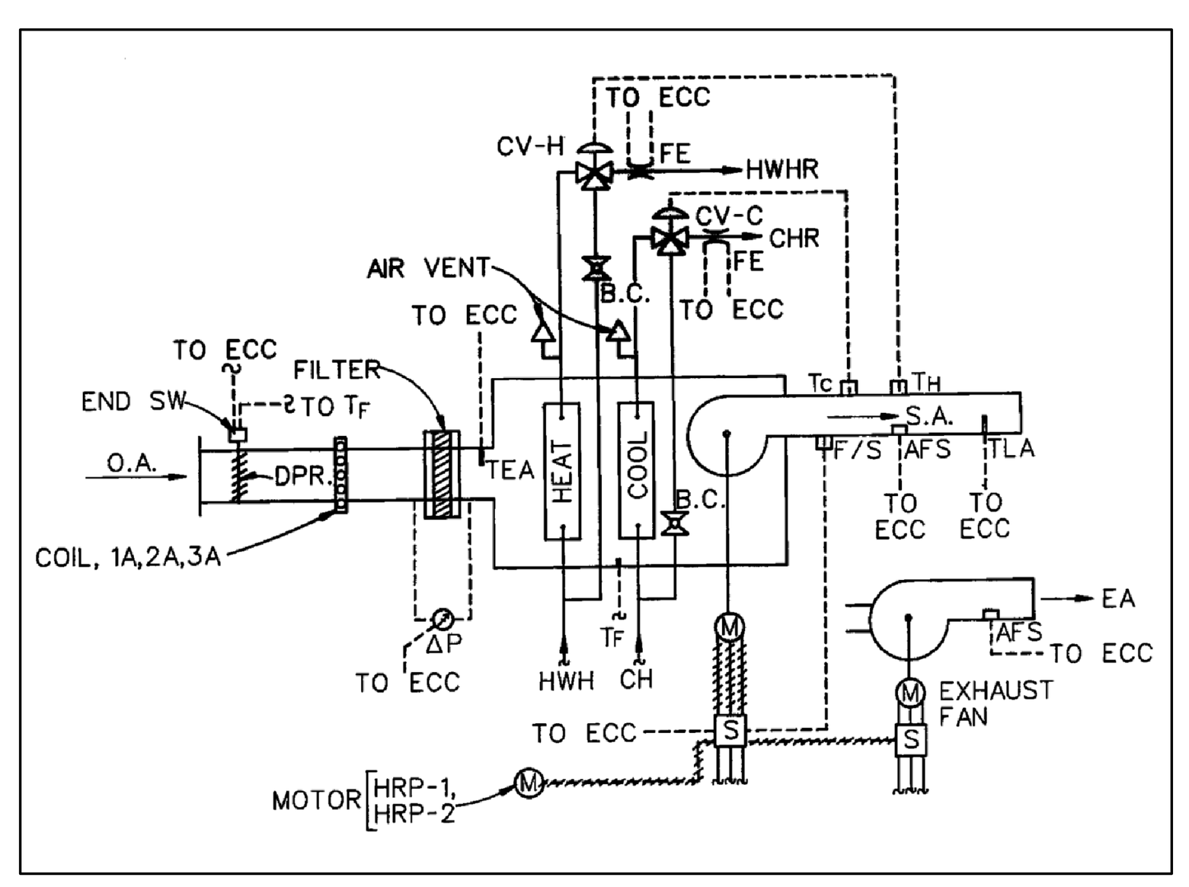
SCHEMATIC – CHILLER CONTROL
NOT TO SCALE

EXISTING CONTROL DEVICES TO REMAIN.
REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

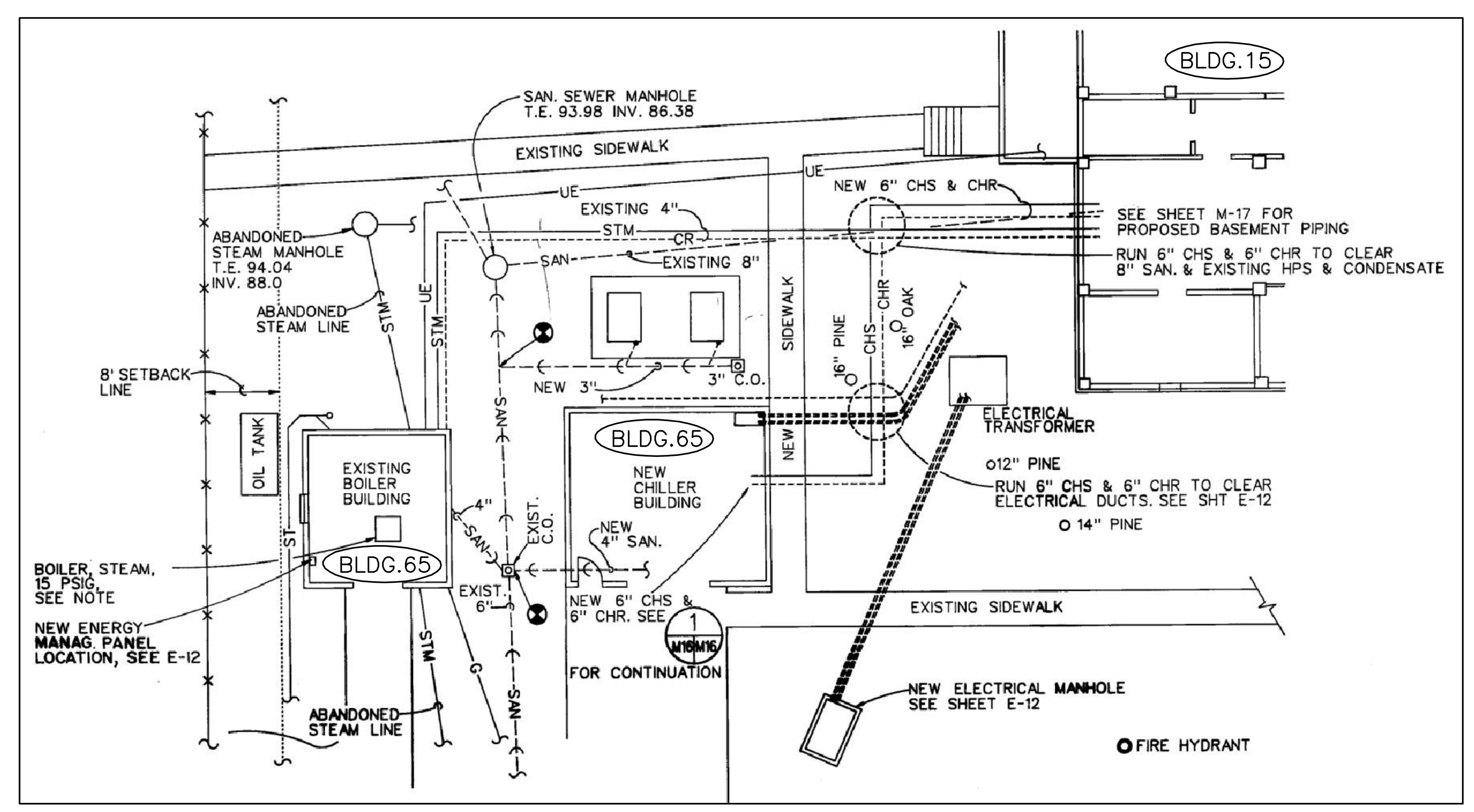
SEQUENCE

1. AIR HANDLER AND EXHAUST FAN START MANUALLY, RUN CONTINUOUSLY.
2. COOLING: Tc MODULATES CHILL WATER CONTROL.
3. HEATING: Th MODULATES HOT WATER CONTROL.
4. FIRE SWITCH F/S STOPS AHU FAN ON HIGH TEMPERATURE (FIRE)
5. FREEZE SWITCH CLOSES O.A. DAMPER ON LOW TEMPERATURE (< 35°F) AND STOPS EXHAUST FAN AND SUPPLY FAN.
6. RUN-AROUND PUMPS, HRP-1,2 AND HRP-3 START WITH AHU-1,2 OR 3 FAN MOTOR, RUN CONTINUOUSLY.
7. HEAT RECOVERY: 3-WAY VALVE MODULATES GLYCOL-WATER FLOW DOWN TO 35°F, O.A. TEMP BELOW 35°F, 3-WAY VALVE IS WIDE OPEN TO COILS. ABOVE 80°F, O.A. TEMP., PUMPS RUN AND 3-WAY VALVE OPENS FOR COOLING RECOVERY.
8. BETWEEN 55°F AND 80°F, O.A., IS DEADBAND FOR RUN-AROUND, HRP-1,2 AND 3 DO NOT RUN.

SEQUENCE OF OPERATIONS
NO SCALE



SCHEMATIC – AIR HANDLING UNIT
NOT TO SCALE



SITE PLAN
NOT TO SCALE

SEQUENCE OF OPERATION

1. OUTSIDE AIR TEMPERATURE ABOVE 75 DEG. F - CHILLED WATER PUMP #1 AND COOLING TOWER PUMP #1 START.
2. CHILLER #1 STARTS, WATER TEMPERATURE CONTROL CYCLES COMPRESSOR TO SATISFY LOAD.
3. CONDENSER #1 - LEAVING WATER TEMPERATURE CYCLES TOWER FAN #1 TO CONTROL CONDENSER WATER TEMPERATURE.
4. OUTSIDE AIR TEMPERATURE ABOVE 85 DEG. F - CHILL WATER PUMP #2, TOWER PUMP #2, AND TOWER #2 START.
5. CENTRAL CONTROLLER STARTS CHILLER #2 AND CYCLES #2 COMPRESSORS TO SATISFY LOAD.
6. FLOW SWITCHES IN CHILLED WATER LINES SENSE FLOW. IF PUMP SHUTS OFF OR CHILLED WATER DOES NOT FLOW, CHILLER SHUTS DOWN, ALARM SOUNDS.
7. IF CONDENSER WATER FLOW FAILS, CHILLER IS SHUT DOWN, ALARM SOUNDS.
8. ALL CONTROLS SHALL BE IN CENTRAL CONTROL PANEL INTERCONNECTED WITH MAIN CONTROL SYSTEM IN BLDG. #47.

NOTE: SEE M-23 FOR CONTROLS NOTE.

SEQUENCE OF OPERATIONS
NO SCALE

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13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R. McDOWELL 6-6-08

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007–30

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Drawing Title: CONTROL DIAGRAMS BUILDINGS 15, 63, 65 - BASE BID & DEDUCT ALTERNATE #1

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03–13–08

Project No.: 637–08–103

Approved By:

Building Number: 47 | Checked: MRM | Drawn:

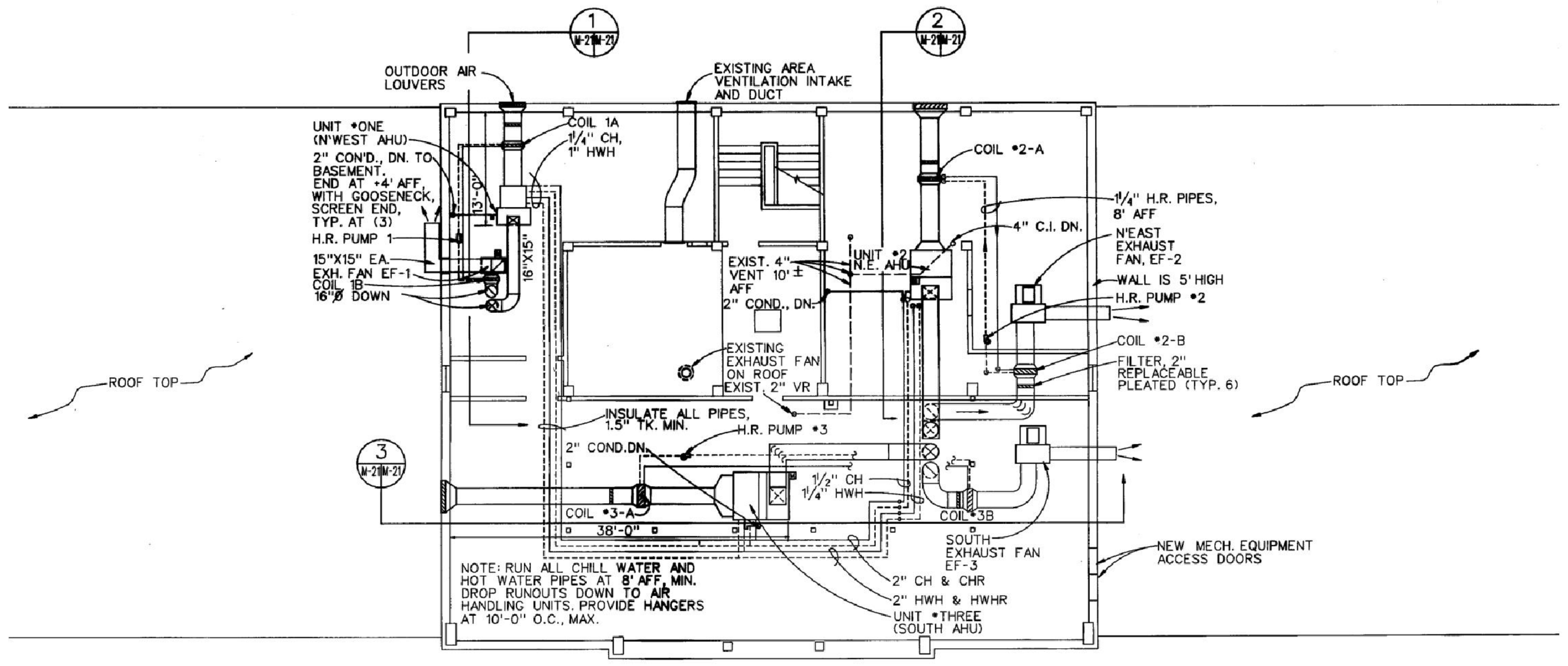
DRAWING NO. M119

Dwg. 26 of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

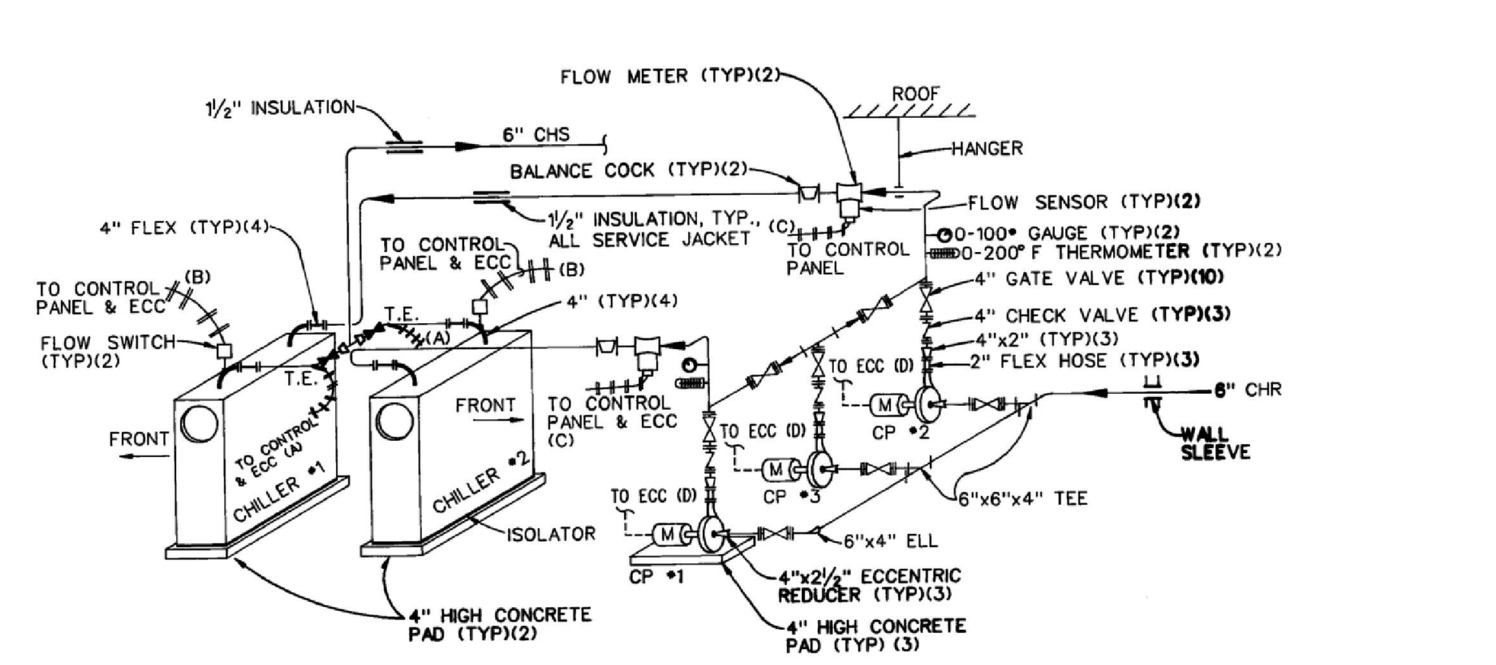
Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs



FOURTH FLOOR HVAC PIPING PLAN (BLDG. 15)

NOT TO SCALE



SCHEMATIC – CHILLERS AND PUMPS

NOT TO SCALE

CONTROLS NOTES

(1) NEW CONTROLS FOR 3 AHU's AND EXHAUST FANS (4TH FLOOR), 1 AHU AND EXHAUST FAN (BASEMENT), HW CONVERTOR SYSTEM (BASEMENT) AND CHILLER BUILDING EQUIPMENT SHALL BE DIRECT DIGITAL CONTROLS WITH PNEUMATIC OPERATORS. THESE SHALL BE COMPATIABLE WITH AND COMMUNICATE WITH THE EXISTING POWERS 600 EMS LOCATED IN BUILDING 47. THIS CONTROL AND COMMUNICATION SHALL BE VIA THE EXISTING LINES BETWEEN BUILDING 47 AND THE EXISTING BOILER BUILDING. (SHEET E-12 SHOWS THE LOCATION OF THE EXISTING ENERGY MANAGEMENT PANEL IN THE BOILER BUILDING) NEW PNEUMATIC PIPING AND INSTRUMENT AIR COMPRESSOR(S) WILL BE REQUIRED.

(2) THE CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR WRITING, INSTALLING AND TRAINING VA PERSONNEL IN THE USE OF NEW CONTROL SYSTEMS GRAPHICS FOR THE EXISTING POWERS 600 EMS. GRAPHICS AND OPERATIONS FORMAT SHALL BE SIMILAR TO THE EXISTING GRAPHICS. PROGRAM SHALL HAVE "COMMENTS LINES", AND SHALL HAVE "PROCEDURES" (SUCH AS "SYSTEM SHUTDOWN", "MONDAY START-UP", ETC.) THAT CAN BE DONE VIA LIMITED KEYSTROKES. PEAK DEMAND CONTROL OF AHU's AND CHILLERS SHALL BE PROVIDED IF REQUESTED.

(3) NEW ITEMS/FUNCTIONS THAT SHALL BE MONITORED/CONTROLLED BY THE EXISTING EMS ARE:

I. AHU's AND EXHAUST FANS
- A) OUTDOOR AIR TEMPERATURE
- B) 4TH FLOOR PENTHOUSE AMBIENT TEMPERUTURE
- C) FILTER PRESSURE DIFFERENTIAL @ 4 AHU's
- D) CHILLED WATER SEND TEMPERATURE @ 4 AHU's
- E) CHILLED WATER RETURN TEMPERATURE @ 4 AHU's
- F) CHILLED WATER COIL FLOW (IN GPM) @ 4 AHU's
- G) HOT WATER SEND TEMPERATURE @ 4 AHU's
- H) HOT WATER RETURN TEMPERATURE @ 4 AHU's
- I) HOT WATER COIL FLOW (IN GPM) @ 4 AHU's
- J) LEAVING AIR TEMPERATURE @ 4 AHU's
- K) O/A DAMPER STATUS (FROM END SWITCH) @ 4 AHU's
- L) SUPPLY AIR FAN STATUS (ON/OFF) AND PROOF (S.P. DOWNSTREAM) @ 4 AHU's
- M) EXHAUST AIR FAN STATUS (ON/OFF) AND PROOF (S.P. UPSTREAM) @ 4 AHU's
- N) DUCT SMOKE DETECTOR STATUS @ 4 AHU's

(SEE SHEETS M-11 AND M-15 FOR AHU SCHEMATIC)

II. CHILLER AND ASSOCIATED EQUIPMENT
- A) CHILLED WATER TEMPERATURE
- B) FLOW SWITCH
- C) FLOW METER
- D) CHILLED WATER PUMP STATUS
- E) TOWER PUMP STATUS
- F) TOWER FAN STATUS
- G) TOWER WATER TEMPERATURE
- H) TOWER FLOW
- I) CHEMICAL FEED STATUS
- J) CHILLER BUILDING AMBIENT TEMPERATURE

(SEE SHEET M-22 FOR SCHEMATICS AND M-16 FOR SEQUENCE OF OPERATION)

III. HOT WATER CONVERTER SYSTEM
- A) HOT WATER SEND TEMPERATURE
- B) HOT WATER FLOW IN GPM
- C) STEAM PRESSURE
- D) HOT WATER PUMP STATUS
- E) CONDENSATE PUMP STATUS

(SEE M-17 FOR CONVERTOR SCHEMATIC AND OPERATING SEQUENCE)

IV. MISCELLANEOUS
- A) SENSE (ONLY) CORRIDOR TEMPERATURES AT/NEAR EACH FLOOR'S NURSE'S STATION, EAST END OF CORRIDOR AND WEST END OF CORRIDOR.

(4) INDIVIDUAL ROOM FAN COIL UNITS SHALL HAVE LINE VOLTAGE ELECTRONIC THERMOSTATS AND ELECTRIC VALVES. NO INTERCONNECTION TO THE EXISTING POWERS 600 EMS IS REQUIRED. (SEE M-11, 12, 13, 14 FOR LOCATIONS)

CONTROLS NOTES

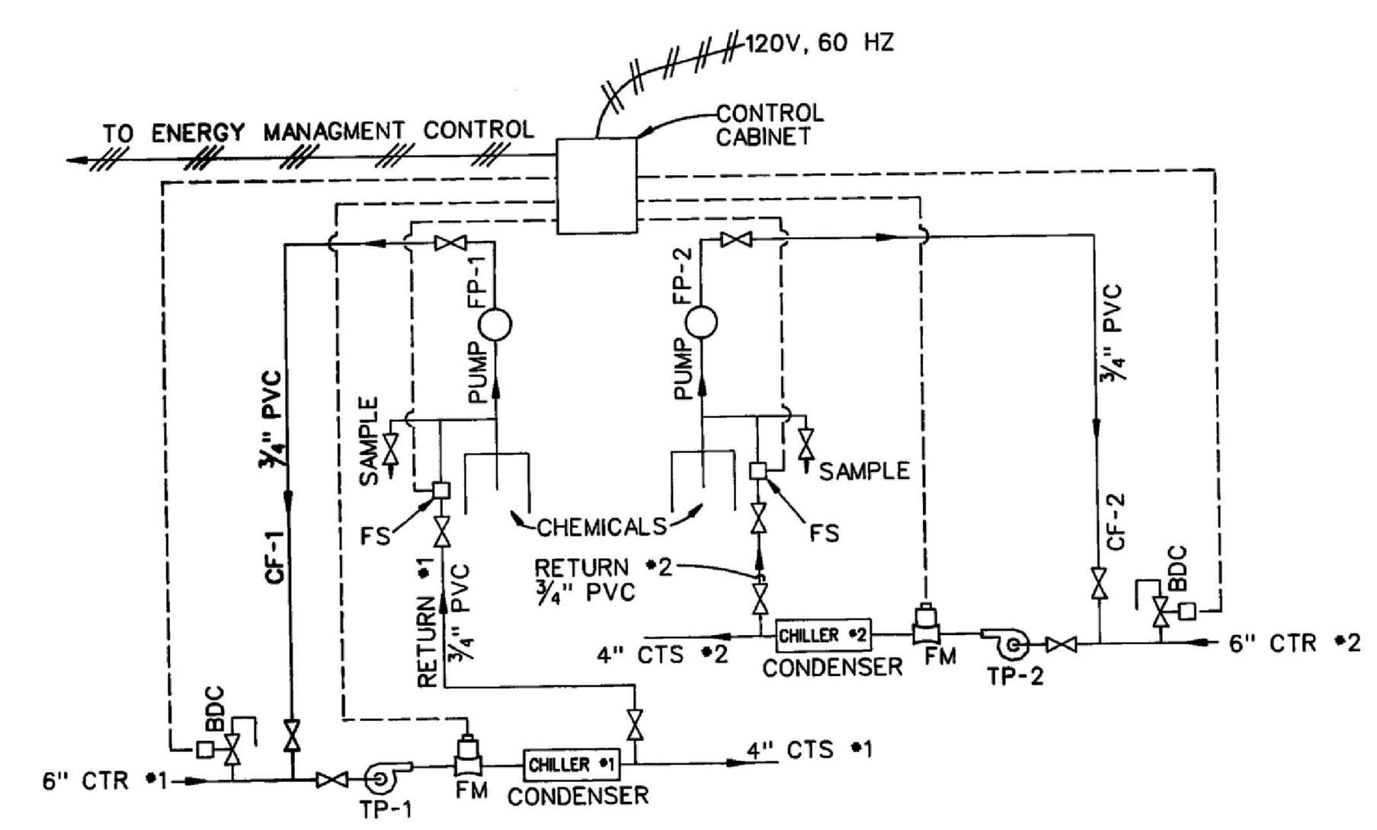
NO SCALE

LEGEND

CHS	CHILL WATER SUPPLY
CHR	CHILL WATER RETURN
CTS	COOL TOWER SUPPLY
CTR	COOL TOWER RETURN
TE	TERMPERATURE ELEMENT
CW	COLD WATER MAKE-UP
M	MOTOR, PUMP/TOWER
(symbol)	GATE VALVE
FM	FLOW METER
(symbol)	PLUG COCK OR BALL VALVE
(symbol)	CONTROL WIRE TO CHILLER CONTROL
CF	CHEMICAL FEED
BDC	BLOWDOWN CONTROL
FS	FLOW SWITCH
ECC	ENGINEERING CONTROL CENTER

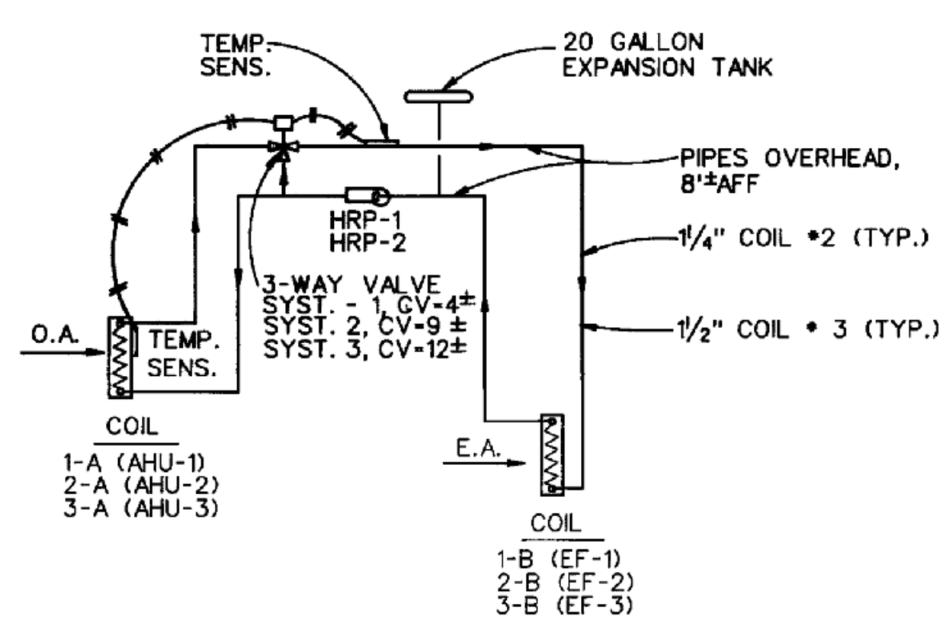
LEGEND

NO SCALE



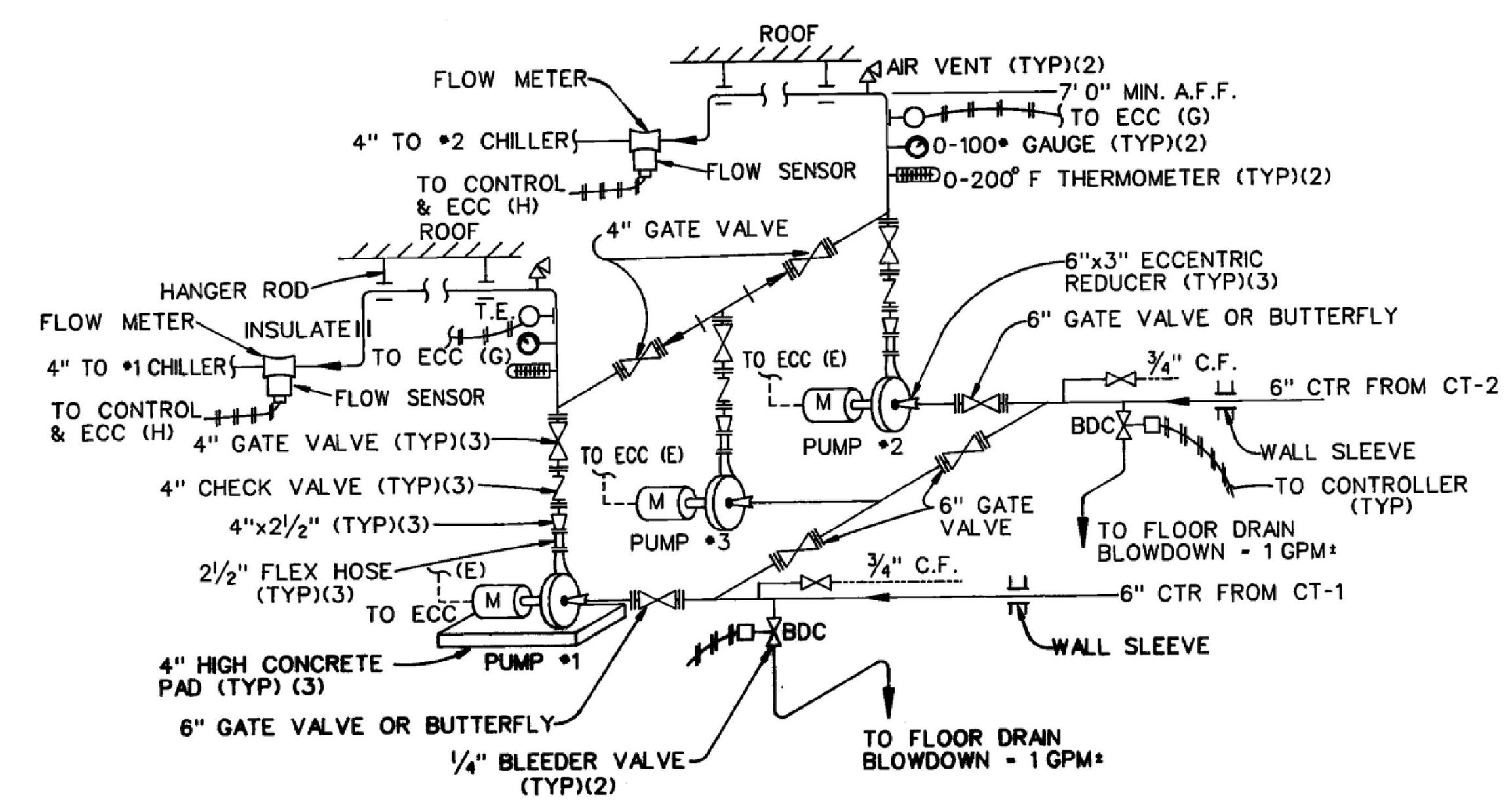
SCHEMATIC – TOWER CHEMICAL FEED

NOT TO SCALE



SCHEMATIC – HEAT RECOVERY

NOT TO SCALE



SCHEMATIC – TOWER PUMPS

NOT TO SCALE

EXISTING CONTROL DEVICES TO REMAIN.
REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

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Revisions | Date

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAMS BUILDINGS 15, 63, 65 - BASE BID & DEDUCT ALTERNATE #1

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No. 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn: WTJ

DRAWING NO. M120

Dwg. 27 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs

LEGEND

1. Existing night low limit thermostat to be replaced with temperature sensor.
2. Existing overcall switch to remain.
3. Existing stand-by pump starter to remain.
4. Existing pump starter to remain.
5. Existing flow switch to remain.
6. Existing steam valve with pneumatic actuator to remain.
7. New water temperature sensor.
8. Existing integral relay to remain (typical of 21).
9. Existing 120/240 volt transformers to remain.
10. Existing relays to remain.
11. Existing cooling tower damper actuator to remain.
12. Existing cooling tower fan starter(s) to remain.
13. Existing cooling tower pump starter to remain.
14. New steam valve with pneumatic actuator.
15. New differential pressure switch.
16. New differential pressure switch.
17. New water temperature sensor.
18. New differential pressure switch.
19. Cooling tower basin freeze protection failure alarm.
20. New CT's, PT's, and KW transducer to measure electrical useage.

LEGEND
NO SCALE

Input/Output Summary

System, Apparatus, or Area Point Description	Analog – Measured: Temperature	Pressure	RH	KW	Analog – Calc.: KWH	Enthalpy	Run Time	Efficiency	KW DEMAND	Binary: Status	Filter	Smoke – FIRE	Freeze	Off-Slow-Fast	Hi-Lo	NIGHT TEMP	OVERCALL MODE
BUILDING #14	X			X	X				X			X					
ROOM #																X	X
CIRCULATING PUMP										X							
STAND-BY CIRC. PUMP										X							
HEAT EXCHANGER	X																
HEAT PUMPS																	
COOLING TOWER FAN																	
COOLING TOWER PUMP																	
BASEBOARD HEAT																	
SUPPLY WATER	X																
RETURN WATER	X																
EXHAUST FANS										X							
OUTSIDE AIR	X																
COOLING TOWER BASIN FREEZE PROTECTION FAILURE ALARM	X																

System, Apparatus, or Area Point Description	Commandable – Pos.: OFF-ON	OFF-AUTO-ON	Commandable – Grad.: Cntrl. Pt. Adj.	Dmpr. Pos.	PNEU. OUTPUT	System Features – Alarms: Hi Analog	Low Analog	Hi Binary	Low Binary	Proof	System Features – Programs: Time Scheduling	Demand Limiting	Duty Cycle	Start/Stop Opt.	Enthalpy Opt.	Reset	Event Program	DDC	Alarm Instruct	Maint. Work Order	HI-LO LIMIT	General: Intercom	Color Graphic	Supplementary Notes
BUILDING #14	X						X				X	X	X	X					X	X		X	X	SEE 47EM32 ALT#1
ROOM #																								
CIRCULATING PUMP	X									X										X				
STAND-BY CIRC. PUMP	X									X										X				
HEAT EXCHANGER					X													X						
HEAT PUMPS	X																			X				
COOLING TOWER FAN	X																			X				
COOLING TOWER PUMP	X																			X				
BASEBOARD HEAT					X													X						
SUPPLY WATER																								
RETURN WATER																								
EXHAUST FANS	X									X										X				TYPICAL OF 4
OUTSIDE AIR																								
COOLING TOWER BASIN FREEZE PROTECTION FAILURE ALARM						X																		

INPUT / OUTPUT SUMMARY
NOT TO SCALE

EXISTING CONTROL DEVICES TO REMAIN.
REPLACE EXISTING CONTROLLERS & PROVIDE
REPROGRAMMING AS REQUIRED.

BUILDING 14 HVA/C

SEQUENCE OF OPERATION

Water source heat pump air handling units 1 through 23 will be individually controlled from ECC.

Exhaust fans 1, 2, 3 and 4 will be stopped and started for occupied periods.

Air handling units will operate continuously, when thermostat selector switch placed in continuous position for occupied periods.

When heat pumps are operational water circulating pumps 1 or 2 will operate as selected.

During unoccupied periods low limit temperature will be maintained either by activating steam baseboard convectors control system when outside temperatures below 20°F, or by activating water source heat pump system when outside ambient above 30°F to maintain 60°F minimum temperature inside building spaces.

An overcall time switch will activate heat pump system when building used during unscheduled periods.

When heat pump system activated compressors will be interlocked by time delay to insure water flow through loop before activating.

Zone thermostats will operate heat pumps in heating or cooling mode as needed to maintain temperature. Fans will cycle in auto position and operate continuously from programmed schedule in continuous position.

When activated by outside air temperature below 50° room thermostat will control steam valves to perimeter baseboard heat convectors.

If water loop temperature drops below 60°F, heat will be added by modulating convector steam valve. Between 60°F and 90°F steam valve is closed and cooling tower is off. If water loop temperature rises above 90°F, the ECC will sequence the cooling tower controls as follows:

1st Stage - Open Damper - 92°F
2nd Stage - Start Spray Pump - 95°F
3rd Stage - Start Fan - 98°F

The above sequence will reverse as loop temperature begins to drop. Temperature alarms at 50°F and 101°F and system shuts down below/above 48° and 102°.

When temperature in solar collectors is higher than loop/storage collector pump will start and operate until temperature approaches equal, during season when heat can be utilized from storage. During cooling season, collectors will be de-focused and circulating pump will operate only as may be required to prevent overtemperature of glycol loop.

ALTERNATE 2 - SOLAR:

Ecc will compare temperature in solar collectors and storage tank. When collector temperature exceeds storage temperature, Pump No. 1 will start and circulate glycol until temperatures equalized. Time delay will be employed to prevent short cycling.

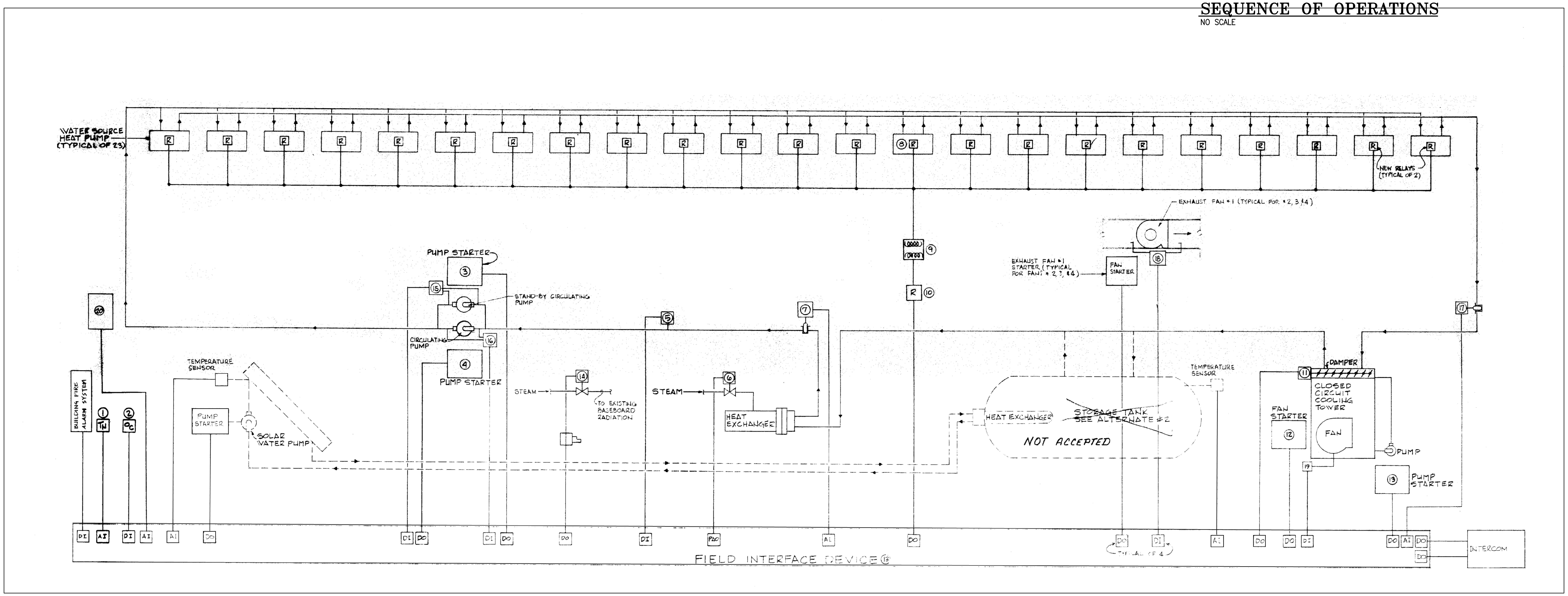
If storage exceeds optimum temperature for season, then cooling tower will operate to reject excess heat as required. Preferably at night, if sufficient to prevent overheating.

Winter cycle maintains storage as high as possible (90°F range) without exceeding 100°F. Summer cycle cool storage, at night, cool as possible (60°F range) by utilizing cooling tower and/or collector circulation to reject heat.

Spring and fall cycles maintain storage between 60° and 90° to provide optimum water temperature for heating and/or cooling as applicable, without rejecting or adding (steam) heat, if sufficient in storage to provide for next day's normal use, considering season, days (normal work, weekend, holiday, etc.), and unit efficiencies at water temperature present.

Provide high temperature alarms and operator instruction, especially when focusing and de-focusing needed.

SEQUENCE OF OPERATIONS
NO SCALE



SCHEMATIC
NOT TO SCALE

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved. and shall be provided by the contractor at no additional cost to the govenment.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufactuers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL SEAL 024539 ENGINEER MARK R. McDOWELL 6-6-08

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POWER PLANT
QUAD 'D' QUAD 'A'
QUAD 'C' QUAD 'B'
N PROJECT NORTH
KEY PLAN

BUILDING IS FULLY SPRINKLERED

BID DOCUMENTS

ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAMS BUILDING 14 - BASE BID & DEDUCT ALTERNATE #1

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn:

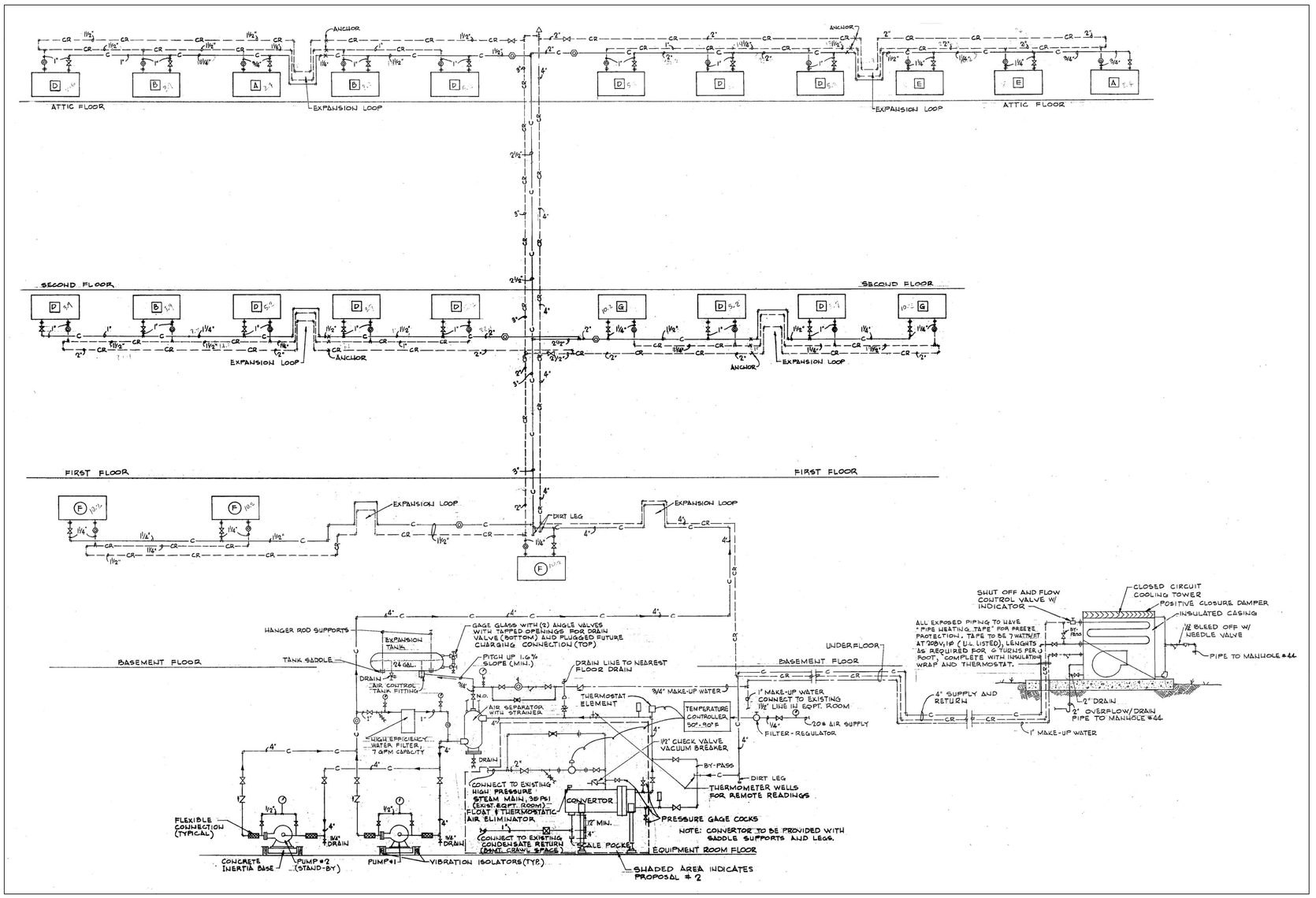
DRAWING NO. M121

Dwg. 28 Of 29

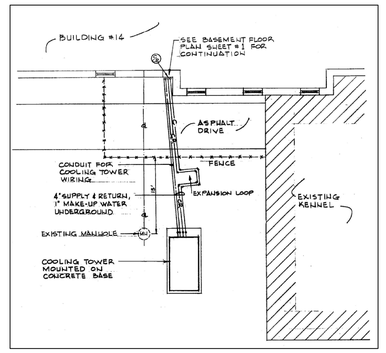
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities
Department of Veterans Affairs



PIPING DIAGRAM
NO SCALE



PARTIAL SITE PLAN
NOT TO SCALE

EXISTING CONTROL DEVICES TO REMAIN. REPLACE EXISTING CONTROLLERS & PROVIDE REPROGRAMMING AS REQUIRED.

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrit at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
7. Contractor to maintain the job site in a neat and orderly fashion at all times. Corridors shall be kept clean of all debris and obstructions to allow safe passage for employees, patients, visitors and workers. Dispose of all trash and discarded matrials and maintain storage within the confines of the job site or other approved areas.
8. All damages incurred to adjacent areas shall be repaired and retored to original condition by the contractor at no additional cost to the government.
9. All materials removed shall become property of the contractor, to be disposed off site unless scheduled to be reinstalled or turned over to the VA.
10. Contractor superintendentshall carry a pager and/or install a job site telephone. Furnish numbers to the project COTR upon contract award.
11. Contractor shall schedule all utility interruptions with the project COTR at least forty-eight (48) hours in advance. Utility interruptions may require overtime work for all trades involved, and shall be provided by the contractor at no additional cost to the government.
12. "Hot Work" permits are required. Notify the COTR twenty-four (24) hours prior to commencement of work.
13. Manufacturers' trade names and numbers used herein identify a minimum standard. Subject to approval of the Contracting Officer, other products shall be considered, provided they are equivalent to these standards and meet the requirements of the technical specifications and drawings.

BUILDING IS FULLY SPRINKLERED

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Revisions	Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R McDOWELL 6-6-08

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POWER PLANT
QUAD 'D' | QUAD 'A'
QUAD 'C' | QUAD 'B'
N PROJECT NORTH
KEY PLAN

BID DOCUMENTS | ARCHITECT PROJECT NO. 2007-30

Drawing Title: CONTROL DIAGRAMS BUILDING 14 - BASE BID & DEDUCT ALTERNATE #1

Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS

Date: 03-13-08

Project No.: 637-08-103

Approved By:

Building Number: 47 | Checked: MRM | Drawn:

DRAWING NO.: M122

Dwg. 29 Of 29

Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.

Location: ASHEVILLE, N.C.

Office of Facilities — Department of Veterans Affairs

VA MEDICAL CENTER
REPLACE HVAC CONTROLS
PROJECT # 637-08-103
ASHEVILLE, NORTH CAROLINA

BUILDING CODE SUMMARY:

NAME OF PROJECT:	VA MEDICAL CENTER REPLACE HVAC CONTROLS
ADDRESS:	ASHEVILLE, NORTH CAROLINA
APPLICABLE CODE:	LATEST EDITION OF NFPA 101 LIFE SAFETY CODE, NEC, NFPA 99
PROPOSED USE:	
OCCUPANCY TYPE:	HEALTH CARE FACILITY
OCCUPANCY SEPARATION:	NA
CONSTRUCTION TYPE:	EXISTING CAST-IN-PLACE CONCRETE (ASSUME TYPE I-A)
ALLOWABLE BUILDING HEIGHT:	NA
ACTUAL BUILDING HEIGHT:	NA
ALLOWABLE GROSS AREA:	NA
GROSS PROJECT AREA:	NA NA
TOTAL GROSS PROJECT AREA:	NA
REQUIRED FIRE RESISTANCE RATINGS:	EXIT ACCESS CORRIDORS – SMOKE RESISTANT CONSTRUCTION FIRE/SMOKE SEPARATION – 1 HOUR RATED CONSTRUCTION FIRE EXIT STAIR – 2 HOUR RATED CONSTRUCTION STORAGE AREAS GREATER THAN 100 S. F. – 1 HOUR RATED CONSTRUCTION
TRAVEL DISTANCE TO EXIT:	LESS THAN 200'. (200' ALLOWABLE FOR FULLY SPRINKLERED BUILDING)
SPRINKLERED/NON-SPRINKLERED:	FULLY SPRINKLERED BUILDING

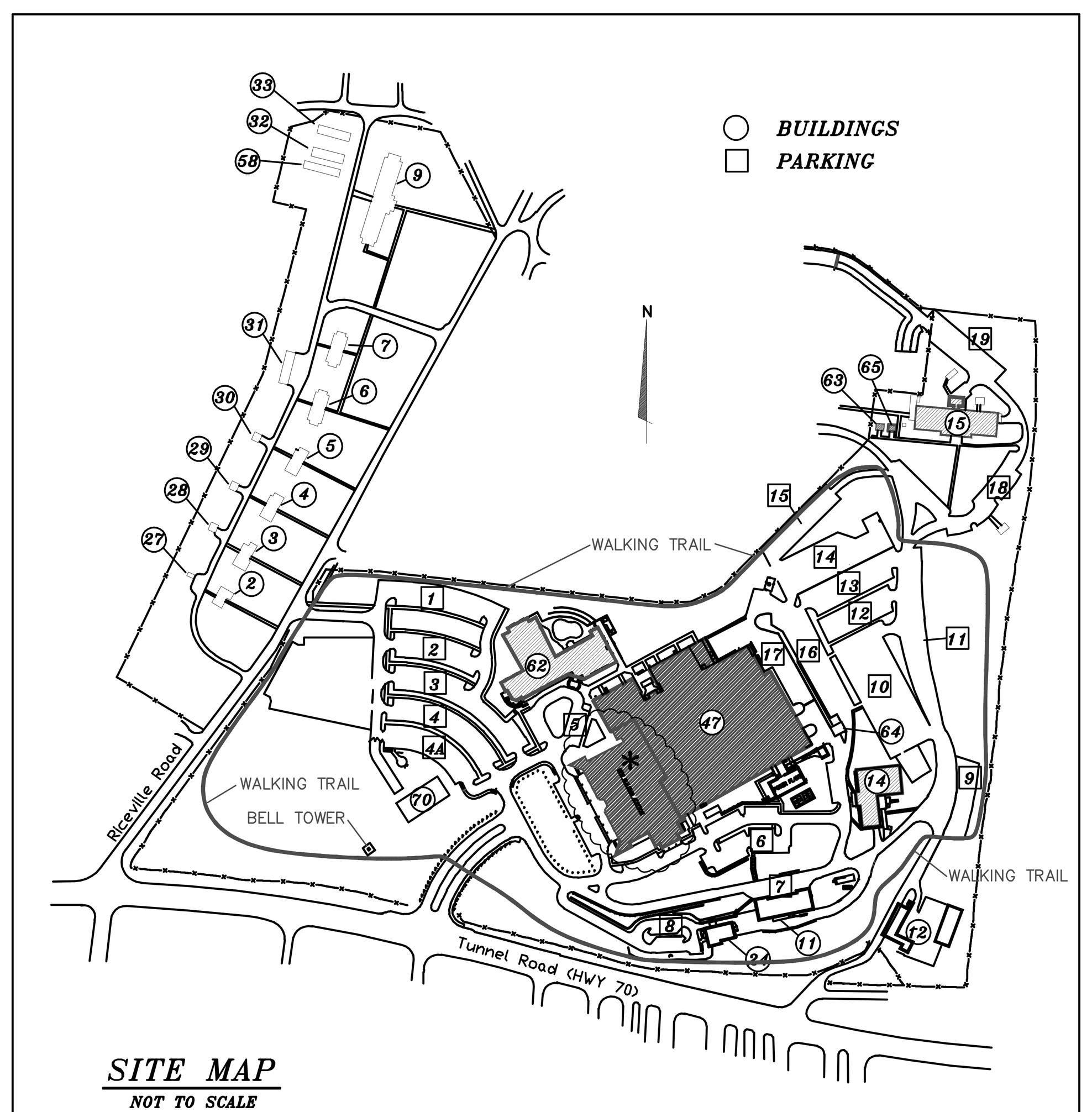
C1 | BUILDING CODE SUMMARY

DESCRIPTION OF WORK:

A) ITEM I, GENERAL CONSTRUCTION: WORK INCLUDES GENERAL CONSTRUCTION, ALTERNATES AND ELECTRICAL WORK, UTILITY SYSTEMS, NECESSARY REMOVAL OF EXISTING STRUCTURES AND CONSTRUCTION AND CERTAIN OTHER ITEMS TO PERFORM WORK FOR THE REPLACE HVAC CONTROLS PROJECT AT THE VA MEDICAL CENTER, ASHEVILLE, NC. WORK WILL BE PERFORMED IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS: BUILDING 47 CONTROLS (A/C #1, 2, 3, 5, 6, 7, 8, AUXILIARY CHILLIER, BOILER ROOM MONITORING, ETC.), BUILDINGS 14, 15, 63, 65, O.R. CONTROLS (BLDG 47).

B) ITEM II, BID DEDUCT ALTERNATE #1: ALL WORK IN ITEM I AND DEDUCT BUILDING 15, 63, AND 65 CONTROLS.

C) ITEM III, BID DEDUCT ALTERNATE #2: ALL WORK IN ITEM I AND DEDUCT BUILDING 15, 63, 65 AND O.R. CONTROLS (BUILDING 47).

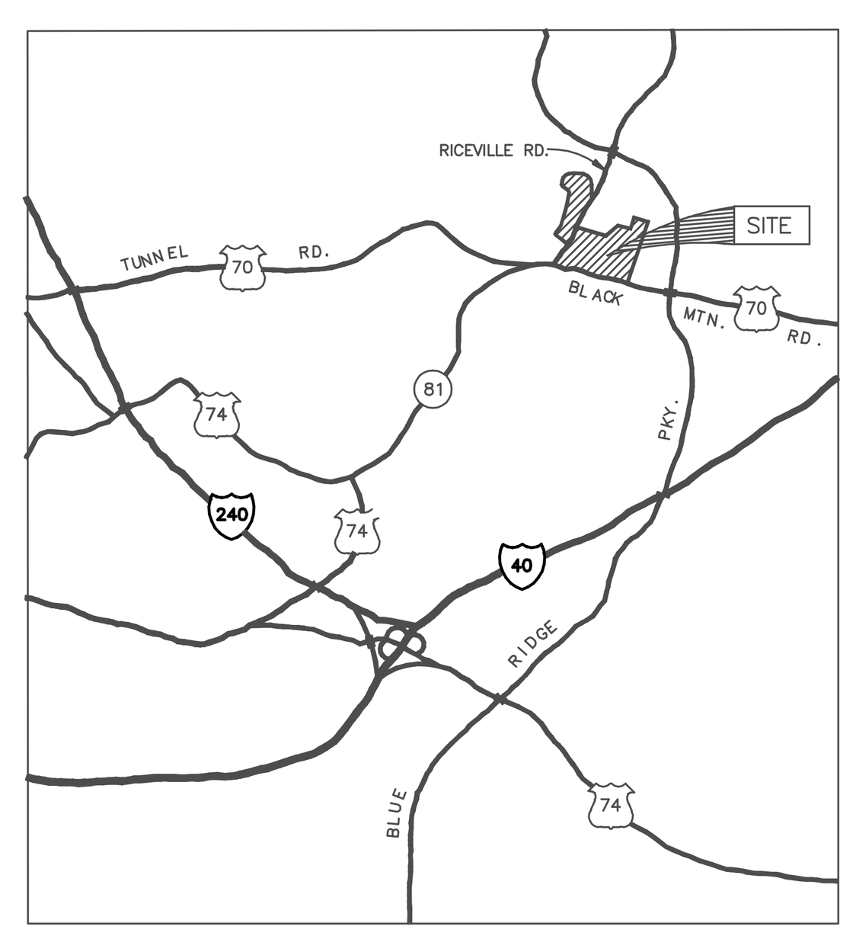


SITE MAP
NOT TO SCALE

BUILDING	FUNCTION
2,3,4,5,6,7	QUARTERS
9	VACANT
11	LINEN
12	LABOR DEPT.
14	ADMINISTRATION
15	ADMINISTRATION
24	CREDIT UNION
27,28,29 30,31	QTRS. GARAGES
32,33,58	STORAGE
47	MAIN HOSPITAL
62	NURSING HOME
63	BLDG.15 BOILER
64	HAZARDOUS WASTE STORAGE
65	BLDG.15 CHILLER
70	MENTAL HEALTH
*	ACA ADDITION

ASBESTOS WARNING:	Approved: Requesting Service — Date:	Approved: Infection Control — Date:
Asbestos Containing Building Materials (ACBM) are present throughout the facility. If contractors find ACBM, or suspect finding ACBM, they shall immediately stop work and contact the project COTR.	Approved: Chief Clinical Support Svc — Date: David Przestrzelski	Approved: M&R Supervisor — Date: Ed Sherlin
Approved: Chief FMST — Date: Robert J. Cornell	Approved: Chief of Staff — Date: Dr. Arnold Brown	Approved: Safety Manager — Date: Sue Ellen Myers
Approved: Assoc. Director — Date: Sallie Houser-Hanfelder	Approved: Medical Center Director — Date: James A. Christian	Reviewed: AFGE — Date: John Roten

F1 | VA STAFF SIGNATURES



F3 | VICINITY MAP

INDEX OF DRAWINGS:

MECHANICAL

A001	TITLE SHEET, CODE SUMMARY, INDEX OF DRAWINGS & GENERAL NOTES
M001	EXISTING CAMPUS HVAC CONTROLS
M002	NEW CAMPUS HVAC CONTROLS, BLOCK DIAGRAMS/ARCHITECTURE
M003	CHILLER ROOM MECHANICAL PLAN BUILDING 47 – BASE BID
M004	CONTROL DIAGRAMS-CHILLER ROOM BUILDING 47 – BASE BID
M005	CONTROLS-SEQUENCE OF OPERATIONS-BUILDING 47-BASE BID
M006	CONTROLS-SEQUENCE OF OPERATIONS-BUILDING 47-BASE BID
M101	CONTROL DIAGRAM – A/C #1 – BASE BID
M102	CONTROL DIAGRAM – A/C #2 – BASE BID
M103	CONTROL DIAGRAM – A/C #3 & H/V #1 – BASE BID
M104	CONTROL DIAGRAM – H/V #2; O.R. AUX. CHILLER SYSTEM; MAIN BOILER ROOM – BASE BID
M105	CONTROL DIAGRAM – A/C #5 – BASE BID
M106	CONTROL DIAGRAM – A/C #6 – BASE BID; O.R. CONTROLS – BASE BID AND DEDUCT ALTERNATE #2
M107	CONTROL DIAGRAM – A/C #7 – BASE BID
M108	CONTROL DIAGRAM – A/C #8 – BASE BID
M109	LARGE SCALE BASEMENT MECHANICAL ROOM & MEZZANINE PLANS – BASE BID
M110	BASEMENT AND CRAWL SPACE MECHANICAL PLANS – BASE BID
M111	LARGE SCALE PENTHOUSE MECHANICAL PLAN – BASE BID
M112	BASEMENT AND CRAWL SPACE MECHANICAL PLANS – BASE BID
M113	ROOF MECHANICAL PLAN – BASE BID
M114	EXISTING MECHANICAL PLANS BUILDING 62 – BASE BID1
M115	EXISTING CONTROL DIAGRAMS BUILDING 62 – BASE BID
M116	EXISTING CONTROL DIAGRAMS BUILDING 62 – BASE BID1
M117	EXISTING DDC POINTS LIST BUILDING 62 – BASE BID
M118	EXISTING DDC POINTS LIST BUILDING 62 – BASE BID
M119	CONTROL DIAGRAMS BUILDINGS 15,63,65 – BASE BID AND DEDUCT ALTERNATE #1
M120	CONTROL DIAGRAMS BUILDINGS 15,63,65 – BASE BID AND DEDUCT ALTERNATE #1
M121	CONTROL DIAGRAMS BUILDING 14 – BASE BID AND DEDUCT ALT. #1
M122	CONTROL DIAGRAMS BUILDING 14 – BASE BID AND DEDUCT ALT. #1

F5 | DRAWING INDEX

FIRE AND/OR SMOKE
WALL/PENETRATION REQUIREMENTS

In general, existing rated walls required to extend to the underside of the deck or structure, and not so doing, shall be extended as follows:

A. At 1 hour plaster/drywall partitions, use 4" metal studs with 5/8" rated gypsum board at each side.

B. Upon completion of the smoke/firewall upgrade, patch and repair and install new wall, floor and ceiling finishes as required.

The Contractor shall note all such areas to be upgraded and shall verify all such areas with the Senior "Contracting Officer or Representative". The contract amount shall then be adjusted to reflect any additional repairs as outlined in the General Conditions of the Contract.

1. See the standard fire/smoke wall and penetration details sheets included in these drawings.

2. All fire and/or smoke rated partitions and corridor partitions shall extend from the finished floor to where it may be sealed tight, such as the underside of the structure or deck above. All penetrations through such partitions shall be sealed per the appropriate UL detail for the wall rating designated.

3. All corridor partitions shall be made smoke tight. All such partitions shall extend from the finished floor to where it may be sealed tight, such as the underside of the structure or deck above. All partitions and any penetrations shall be sealed tight with drywall compound or sealant. Rated walls shall be sealed per UL rating.

4. In new construction or conditions requiring existing construction to be removed, all penetrations through floor slabs such as piping, conduits, ducts, pneumatic tubes, etc., shall be packed and sealed off with a fire rated material, in accordance with the applicable details.

5. Existing fire/smoke walls within the limits of construction shall be inspected to correct the following items, if required:

A. Partition extends and is tight to and sealed off from the bottom of the deck or structure above as typically detailed on the drawings.

B. All penetrations and holes through the walls are repaired/patched in accordance with the applicable details.

C. Existing recessed mounted items larger than 16"x16" inches square , in rated partitions, are to be encased in a double fire wall or encased in 5/8" gypsum board enclosures on all sides.

6. Existing penetrations: Existing concealed areas such as chases, underside of floors below existing toilet/bathroom facilities, below existing equipment, etc., within the limits of construction, shall be examined by the Contractor during the process of construction. All such areas having open penetrations shall be sealed off with fire rated material as required. The Contractor shall note the extent of such areas and shall verify all such areas with the Senior "Contracting Officer Representative". The contract amount shall then be adjusted to reflect such repairs as outlined under the General Conditions of the Contract.

7. Any device located in a fire and/or smoke rated wall up to 16"x16" in size shall be protected with one layer of 5/8" rated gypsum board for 1 hour walls. The device shall be completely enclosed by the gypsum board which shall be screw attached to auxiliary drywall framing as required to provide the proper size enclosure. Electrical boxes, not over 16 square inches, may be protected by an approved intumescent pad in lieu of being boxed in with drywall.

F7 | GENERAL NOTES

GENERAL NOTE:
1. Contractor shall field verify all dimensions.
2. Schedule on site inspections with the project COTR.
3. Contractor shall comply with OSHA, EPA, NFFPA and all other applicable safety codes and regulations at all times.
4. All work shall be performed by craftsman who are journeymen of the trade in which they are performing work.
5. Contractor superintendent shall report to the COTR each morning before work begins, at which the daily schedule shall be discussed.
6. Contractor shall maintain dust contrl at all times. Contractor shall use "sticky mats" outside each work area and shall erect barriers to minimize dust/dirt, spreading/tracking to the greatest extent possible.
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BUILDING IS FULLY SPRINKLERED

Revisions | Date

Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 024539 MARK R. McDOWELL 6-6-08

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KEY PLAN: POWER PLANT; QUAD 'D'; QUAD 'A'; QUAD 'C'; QUAD 'B'; N PROJECT NORTH

BID DOCUMENTS	ARCHITECT PROJECT NO. 2007-30		
Drawing Title: TITLE SHEET, CODE SUMMARY, INDEX OF DRAWINGS AND GENERAL NOTES	Project Title: VA MEDICAL CENTER REPLACE HVAC CONTROLS	Date: 03-13-08	
		Project No.: 637-08-103	
Approved By:	Building Number: 47 / Checked: MRM / Drawn: WTJ	DRAWING NO. A001	
Note: Asbestos Containing Building Materials (ACBM) are present. Thermal Systems Insulation (TSI) and Miscellaneous ACBM are present in various locations.	Location: ASHEVILLE, N.C.	Dwg. 1 Of 29	

CONFEDENTIAL: THESE DRAWINGS MUST BE RETURNED TO FACILITY MANAGEMENT SERVICE, PROJECT SECTION, UPON COMPLETION, OR UPON FINAL USE BY THE CONTRACTOR FOR BIDDING PURPOSES.

Office of Facilities
Department of Veterans Affairs